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Standardized Screening for Peripheral Artery Disease in the Primary Setting

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Implementation of a Peripheral Artery Disease Screening Tool

Problem: Peripheral artery disease (PAD) affects eight million Americans and is the third leading cause of death in the U.S. in people 60-85 years of age. Veterans are at a 45% greater risk to develop PAD than non-veterans. Left untreated, PAD can progress to hospitalization for revascularization, amputation, or death. The American Heart Association (AHA) recommends using a standardized screening tool for the diagnosis of PAD; however, a lack of standardized screening is problematic in veterans receiving proper intervention.

Methods: This quality improvement (QI) project utilized a descriptive, observational design. The American Heart Association (AHA) screening tool was administered by primary care providers (PCPs) to a convenience sample of adult patients aged 50-85 years old in the primary care setting. The number of Ankle Brachial Indices (ABI) and referrals retrieved in a retrospective record review 3 months prior to education in the use of the ABI and 3 months after education were compared.

Quantitative data were collected during the face-to-face clinic visits. Data collected during the time of this (QI) project included the number of screenings administered, number of ABI tests ordered and the number of referrals to vascular specialty generated.

Results: In the 3 months prior to the implementation of the screening tool, the PCP referred to vascular specialty 18 times and after the tool was implemented only once. The number of ABI tests ordered was 45 prior, and 11 tests ordered after the implementation, the average number of risk factors 2.61 and the average number of symptoms were 1.11.

Implications for Practice: The implementation of the screening tool in the primary care settings could increase education among primary care providers on early identification of PAD with treatment and management. Standardized care among primary care providers,

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improved effectiveness of care in the primary care setting, and improved patient healthcare outcomes could eliminate unnecessary referrals and reduce the serious complications of PAD.

Implementation of a Peripheral Artery Disease (PAD) Screening Tool in Primary Care Clinic

Over eight million Americans have been diagnosed with PAD and it is the third leading cause of death in the U.S. (Trigoboff, 2018; Williams et al., 2019). PAD is an accumulation of plaque and lipids between the layers of the arterial walls causing an obstruction of blood flow to extremities (Tummula & Scherbel, 2018). The disease often presents as pain in the legs, cramps, numbness and tingling but can progress to ulceration and tissue ischemia quickly (Itoga, Minam & Owens, 2018; Tummula & Scherbel, 2018). If left untreated, the disease could progress to hospitalization for revascularization or amputation (Willey et.al 2018). Studies have shown that primary care providers are primarily responsible for diagnosing, managing, and referring patients with peripheral artery disease (PAD).

Currently, the number of veterans affected by PAD is unknown; however, veterans have a 45% greater risk than non-veterans of developing of PAD due to certain risk factors (Willey, 2018). Many researchers have agreed that smoking is the most significant risk factor for developing PAD and is a common behavior among veterans (Golden et al., 2018). Cigarettes were supplied by the military commissaries and given to soldiers in their backpacks, leading to a high incidence of smoking in this population. (Golden et al., 2018; University of Glasgow, 2017). Additional risk factors are a high

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incidence of diabetes, hyperlipidemia, and hypertension common in veteran populations (Centers for Disease Control and Prevention [CDC], 2019; Gardner, 2014; Golden, 2018; Morcos et al., 2018; Tummula & Scherbel, 2018; Wiley et al., 2018).

According to Shu and Santulli (2018) PAD has widespread prevalence which reduces the quality of life and remains overall underdiagnosed and undertreated. The lack of implementation of a standardized screening tool for identification and referral has led to ineffective assessment and treatment of this population. The data has shown that the providers lacked consistency on screening for patients with PAD and patient outcomes were inconsistent as a result. The variations from provider-to-provider practices resulted in differences with ordering of ABI's and the referrals of these patients along with delays in care. The implementation of a standardized screening tool is intended to promote superior and consistent delivery of services and is considered best practice to improve health outcomes for veteran populations.

The purpose of this quality improvement initiative was to educate primary providers to screen, identify and refer to vascular specialty care. Patients were screened in a primary care setting, most of whom had multiple risk factors and one to two at risk symptoms. The Plan-Do-Study-Act (PDSA) was the evidence-based framework chosen to guide this project. The aim of this project was to achieve a 50% documentation rate of a screening symptom checklist completed, a 50% increase in ABI tests ordered and an increased referral rate to vascular specialty by the end of the 3-month implementation.

Literature Review

A literature review was conducted utilizing the following search engines: PubMed, CINAHL, and Elsevier Clinical Key. Publications from 2013 to 2019 were

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searched. The databases were searched in English language using key terms PAD diagnosis, “PAD screening”, “ankle brachial index testing”, “risk factors of PAD”, “PAD treatment guidelines”, AND “veteran with PAD”. Inclusion criteria consisted of veterans between age 50-years and 85-years, veterans with PAD, and veterans with risk factors of hypertension, diabetes, smoking and hyperlipidemia. Those studies excluded were the non-veteran population, veterans younger than 50-years or older than 85- years, and veterans without any risk factors of PAD. A total of 23 publications were selected for this review. The limited literature found reports that screening should start in the primary care environment (Hageman, 2018; Trigoboff-Kohlman, 2018). Most of the studies found on PAD discuss primary care providers managing PAD rather than screening for it.

According to the Center for Disease Control and Prevention (CDC) 2019; the American Heart Association (AHA) & American College of Cardiology (ACC) (2016 the primary risk factor for PAD is smoking. The research has identified that smoking causes inflammation that leads to plaque forming in the arteries. Other studies identified common risk factors to PAD such as hypertension, hyperlipidemia, and diabetes (CDC), 2019; Gardner, 2014; Golden, 2018; Morcos et al., 2018; Willey et al., 2018). Studies have discussed that diabetes has a strong correlation to the development of PAD.

Diabetes is an accumulation of sugar in the blood that leads to the thickening of arteries and narrowing the blood flow to lower extremities. The risk factor of hyperlipidemia affects the arteries wall with plaque buildup. muscles in the arteries fight back, they grow bigger, and the arterial walls become thicker. The narrowed arteries can burst or become blocked AHA/ACC, (2016). These studies shared information on the risk factors causing the narrowing of the arteries to the lower

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extremities consistent with PAD. Multiple studies emphasized that use of ABI testing is gold standard to confirm the diagnosis of PAD (AHA/ ASA, 2016; CDC, 2019; U.S. Preventive Services Task Force, 2018). According to Itoga, et al. (2018), the cost to perform an ABI in the primary care setting is approximately \$100 and there is minimal risk. Hence, use of a standardized screening tool which includes a symptom checklist can assist in assisting primary care providers in the identification of the progression of PAD and help to streamline disease management. The literature supports the idea that when a standardized tool is in place it is more cost effective, and helps providers feel more confident in their management skills of patients with PAD resulting in decreasing inconsistent patient management. The evidence based AHA/ACC guidelines directs the primary care providers with the management and referral process for PAD in need of specialty care.

The framework for this this quality improvement project was the Plan Do Study Act (PDSA) model. The PDSA process provided a pathway for understanding the effects of the project, as well as when and how to evaluate the project components (Hickey & Brosnan, 2017). Initially, a PAD symptom checklist, developed by the AHA & ASA, was distributed to the healthcare staff in the primary care clinic. Next, providers were educated about how to use the screening tool, including use of the ABI for further evaluation, and when referral to specialty care is appropriate. Clinic nurses were also educated on use of the PAD screening checklist to use with patients during their primary care visits. The PDSA cycle allows for the implementation of the screening tool and evaluation of the data collected.

Methods

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Design

This quality improvement initiative utilized a descriptive, cohort design. Quantitative data regarding the number of ABI tests and referrals three months prior to the initiation of the project was collected in a retrospective chart review. The number of ABI's and referrals retrieved 3 months prior and 3 months after education were compared.

Quantitative data was collected during the face-to-face clinic visits. Data collected during the time of this (QI) project included the number of screenings administered, number of ABI tests ordered and the number of referrals to vascular specialty generated. Data collection included the number of screening tools administered, number of symptoms, number of risk factors, number of ABI tests ordered, and number of referrals generated to vascular specialty. Demographic data included age and gender.

Setting

This project was completed in a VHA outpatient primary care, internal medicine clinic located in an urban, Midwestern area populated by three million residents. This clinic had three primary care providers; 1 provider dropped out of the project due to a new position. There were 3 registered nurse case managers, one assigned to each provider, 3 licensed practical nurses, and a clerk. There was also one dietician, a social worker, a telehealth registered nurse, a pharmacist, and a mental health provider. Approximately 6,500 veterans are seen annually in this clinic.

Sample

This project used a convenience sample of records of veterans aged 50-85 years seeking care in the VHA outpatient primary care clinic. Patients younger than 50 and

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older than 85 years of age were excluded. All participants seen in the primary care settings over the designated periods received care by three physicians.

Procedures

A team of key stakeholders was formed to include the VHA nursing administration, office medical and ancillary office staff to plan implementation of the new screening process. The American Heart Association APD screening tool was introduced to the clinic health care team consisting of 3 physicians, and 3 nurses. Education on the screening tool was provided to the nurses first then the primary care providers on the PAD symptom, ABI testing and when to refer to vascular specialty. In addition, a copy of 2016 AHA/ACC PAD practice recommendations was given to each provider. Each primary care provider and nurses were educated all together at the luncheon meeting and there was time allotted to allow for questions. Nursing staff was responsible for administering the tool to each veteran that entered the clinic while they waited in the waiting area. Nursing staff collected the screening tool upon completion and placed on the veteran's chart for PCP review. The PCPs reviewed the checklist and followed the guided protocol for ordering ABI's, and referrals as indicated.

Data Collection/Analysis

The demographic data collected was age and gender. The screening tool consisted of physical symptoms and risk factors, and they were recorded on the checklist (appendix A). The ABI algorithm was used by the providers as a tool to instruct them on when to refer the patients to the vascular specialty (Appendix B). The number of ABI and referrals ordered were recorded on (Appendix C). All personal identifiers were removed,

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and data was coded by dates in an Excel spreadsheet. Descriptive data consisted of means of the number of ABI screenings and referrals to specialty care.

Approval Processes

A formal, written approval was obtained from Veteran Health Administration (VHA), University of Missouri-St. Louis (UMSL) and lastly the Institutional Review Board (IRB). This project protocol was assessed and determined not to be human subject research.

Results

Demographics of the sample

The sample included 100 patients aged 50-85 years, with the mean of 66.4 years old. There were 100% male participants. No other demographics were obtained in this study.

PAD screenings

A retrospective chart review of 256 primary care patient encounters from July 1, 2020 through September 30, 2020, showed zero PAD screenings were conducted and eighteen (n=18, 14.2%) specialty care referrals were completed before the QI project implementation. During the implementation period October 13, 2020, through January 31, 2021, 150 patients visit met the inclusion criteria of primary care visits, 100 participants completed the screening tool while 50 (34%) refused to participate. All screenings were conducted by a face-to-face encounter in the primary care setting. Of those screened, 100% (n=100) individuals had one or more symptoms and risk factors. None of the participants had received a previous referral to specialty care from this primary care clinic. Following implementation of the QI project, 1 (n=1, 1%) new referral

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was initiated, resulting in a decrease from the previous 18% before the implementation of the screening tool.

One hundred percent of the participants that completed the PAD screening tool had 1 or more risk factors and symptoms. The average number of risk factors was 2.61 (SD1.127), the average number of symptoms was 1.11(SD .490). The average number of ABI tests ordered were .11(SD .314) and the referral average was .01 (SD .100).

Discussion

A noticeable change was identified in vascular referral rates from 18 down to 1 after the implementation of the screening tool. Some of the possible reasons for this could be due to the increased knowledge of PCPs using the screening tool with the accompanying care interventions at each level. Referral to specialty care may have been unnecessary if PCPs were providing recommended interventions. The providers' interventions were not known. They may have used the screening tool to identify the need for further action and not requesting referrals, but this needs to be determined in future research. Further, more demographic information could have been identified to understand potential differences in various groups; further research is needed to answer this research aim.

The data shows that the implementation of the PAD screening tool documentation rate resulted in an increase in compliance from 0%-100%. During the 3-month time frame after implementation, 150 patients met the criteria with 100 (66%) participants who completed the screening checklist. The other 50 (34%) patients refused to participate for various reasons such as, they did not understand the purpose even after the health care staff explained it. Descriptive data was collected during the first phase of the PDSA cycle

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to better understand the age and sex of the cohort when screening was initiated. A second PDSA cycle may be used to obtain more data such as race, education, income, and employment for further statistical tests.

The participants were all male due to the primary care clinic selected. This all-male sample did not give a representative sample for the overall population at higher risk for PAD. According to Hiramoto et al (2014) women are at a higher risk for PAD than men, but the comparison is understudied as to why women are at higher than men.

The nursing staff was responsible for ensuring all qualified veterans ages 50-85 completed the PAD checklist. All the primary care providers and nurses worked together to answer the veteran's questions about PAD screening tool and referrals. The nurses were the major contributors to this project by handing out the screening tool to each qualified veteran. The providers were to learn how to correctly diagnose PAD and when to refer to vascular specialty. The results of this project were limited due to many unforeseen circumstances. Due to Covid 19 restrictions, this study did not capture all assessments from provider phone encounters. Only in clinic, face-to-face encounters are included in the data. This project has enough data to continue to another PDSA cycle with the permission of the VA medical center stakeholders to roll it out to all primary care clinics.

There were other limitations of this QI project. The project was only implemented in one of the multiple clinics in the VHA. Data was collected by self-report which may not always be accurate. The primary care providers were all physicians with no mid-level providers (PA and NP's). The primary care providers were concerned that the reviewing of the completed screening tool would take extra time extending their scheduled visit of

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20 minutes. Primary care providers expressed concerns regarding ABI test ordering and their responsibility to follow up on the results. Lastly a survey administered to the three providers may have provided more insight regarding the screening education.

Implications

There is a need for the implementation of the PAD screening checklist into practice for standardized screening in the primary care settings. Primary care should focus on goals to standardize care among primary care providers, improve effectiveness of care in the primary care setting, and improve patient healthcare outcomes.

Conclusion

Administrative participation is needed to support education for all primary care staff on the PAD screening. The project was designed to increase the knowledge of the primary care providers on PAD, improve quality of care, and standardized current practice. The data regarding care following PAD screening is needed in future research.

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Appendix A

PAD Initial Symptom Checklist

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Risk factors/Symptoms	yes	no
Are you 50 or older		
Do you smoke or ever smoked		
Do you have any of the following:		
Diabetes		
Chronic kidney disease		
High blood pressure		
High cholesterol		
PAD, cardiac disease, or stroke		
Are you having any of the following symptoms?		
Any heaviness in legs		
Any changes in color to your legs or feet (blue, black, or purple)		
Does pain in your legs keep you awake at night		
Any sores or wounds o toes, feet, or legs		
Any hair on toes and legs		
Are pain in the legs when you walk		

Adapted from the American Heart Association and American Stroke Association. (2020). *PAD Initial*

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Appendix B

Ankle Brachial Index

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ABI Value	Interpretation	Recommendation
Greater than 1.4	Calcification/Vessel Hardening	Refer to vascular specialist
1.0-1.4	Normal	None
0.9-1.0	Acceptable	None
0.8-0.9	Some Arterial Disease	Treat risk factors: Lifestyle changes, medical management
0.5-0.8	Moderate Arterial Disease	Refer to vascular specialist
Less than 0.5	Severe Arterial Disease	Refer to vascular specialist

Adapted from Stanford Medicine. (2020) *Measuring and Understanding the Ankle Brachial*

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Appendix C

Results

