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Predictors of Peripheral Artery Disease among Elderly Respondents in an Urban Hospital, Edo State Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. All the authors have read and agreed to the final manuscript.

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ABSTRACT

Peripheral artery disease (PAD) potentially affects health-related Quality of Life, Disability Adjusted Life Years (DALYs) and is a strong prognostic marker for future cardiovascular events in elderly population. PAD commonly affects the elderly but may go undiagnosed in them, probably due to the presence of other morbidities like osteoarthritis and associated muscle spasm.

Aim. The aim of this study was to determine the predictors of PAD in elderly by evaluating the socio-demographic and clinical characteristics in elderly patients.

Methods. A cross sectional hospital based study was carried out among 370 patients aged 60 years and above attending a Tertiary Hospital from September to November 2017. A systematic random sampling technique was utilized. A structured questionnaire was administered to collect data on socio-demographic characteristics, lifestyle variables, and medical history. The Ankle Brachial Index (ABI) was used to assess for PAD. Analysis was done using Chi-square test and logistic regression.

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Results. The mean age was 69.3±7 years comprising of 76.5% females, 50% of the respondents were married while 47% were widowed. After adjusting for other variables, the result of the multi-logistic regression indicated that only patients with abnormal pedal pulse were more likely to present with PAD than those with normal pedal pulse (OR=10.634, 95% CI=2.4-47.121, p=0.002).
Conclusion. The study reveals that abnormal pedal pulses were significant predictors of PAD, therefore it is recommended that regular screening (clinical foot examination and ABI) should be done for elderly to achieve early detection of PAD and facilitate prompt treatment.

Keywords: Elderly; Peripheral Artery Disease; predictors; Benin City.

1. INTRODUCTION

Peripheral Arterial Disease (PAD) is an important non-communicable disease which has a global impact. Worldwide, over 200 million people have PAD [1] and approximately 8 million people are estimated to have PAD in the USA, among which 1.8 million have symptomatic PAD while in Germany 50,000-80,000 develop critical limb ischemia every year [2]. Estimates of the burden of PAD are lacking in Sub-Saharan Africa, however a prevalence of PAD (24.2%) was found in a survey in Bangui (Central African Republic) and Brazzavile (Congo), with important disparities found for the prevalence of PAD between the two cities (15% in Bangui versus 32.4% in Brazzaville) [3]. A similar prevalence of 29.3% was found in South Africa [4]. Moreover, a recent systematic review of PAD in Sub-Saharan Africa found that the prevalence ranged from 3.1% to 24% among adults aged 50 years and above [4-5]. The PAD prevalence increased from 39% to 52% among those with known risk factors [6]. A study conducted in urban and rural populations of Central Africa also reported a prevalence of 14.8% among the elderly population [7].

The risk factors most commonly reported as associated with PAD are socio-demographic factors, lifestyle variables and diseases such as hypertension, diabetes and related metabolic disorders. The association between gender and PAD has been inconsistent across studies, with a higher prevalence among males in some studies [8], while others reported higher odds of the disease in females [7,9,10]. PAD has been shown to increase with age [3,11] and higher in urban areas [7], while ethnic differences have been reported in the United States, with a study reporting higher prevalence among non-Hispanic blacks and Mexican-Americans compared to non-Hispanic whites [12]. Blacks are most likely to present with PAD than other ethnic group [1,12].

Data on the relationship between PAD and lifestyle-related variables such as BMI and alcohol intake are conflicting, while studies have shown an association between lifestyle variables such as smoking and physical inactivity which facilitate inflammation of the vessels leading to the development of PAD [3,7,13].

Hypertension and diabetes are independent risk factors for PAD [14] as shown by the United Kingdom Prospective Diabetes Study (UKPDS). Similarly, The Framingham Heart Study revealed that blood pressure greater than 160/95 mmHg has a 3-4 fold increase risk for intermittent claudication [14-15]. Other risk factors include dyslipidaemia, [14] and chronic kidney disease [16]. The association has been inconsistent between PAD and other risk factors such as hyperhomocysteinemia [16,17] and acute-phase reactant proteins such as C-Reactive protein (CRP) and fibrinogen [17].

The associations reported for PAD were mostly done in studies conducted in the developed nations of the world. The strength and direction of these associations could differ among Sub Saharan African population, however there is paucity of studies investigating PAD risk factors. The purpose of this study is to identify the socio-demographic, lifestyle, and clinical risk factors for PAD among elderly patients attending care at the outpatient of the University of Benin teaching hospital, Nigeria.

2. METHODS

The study was carried out in the General Practice Clinic of University of Benin Teaching Hospital, Benin City, Nigeria. It received referrals from neighbouring five states in the southern part of Nigeria. The General Practice Clinic is run by the Department of Family Medicine provides an outpatient services. There are 12 consulting rooms for the following subunits: Emergency/Observation room, NHIS clinic, Geriatric clinic and General outpatient clinic. The

geriatric clinic runs for 5 working days in a week, with a turnover of approximately 36 elderly patients per day. The clinic is managed by the Department of Family Medicine as an outpatient clinic. On average, 180 elderly patients are seen weekly.

2.1 Study Population and Duration

The study population comprised of elderly patients aged 60 years and above that attended the General Practice Clinic of the University of Benin Teaching Hospital within a period of 3 months. A preliminary review from the General Practice Clinic's records department in a sampled year 2016, revealed that an average of 36 elderly patients were seen daily, 180 (36x5) elderly patients were seen weekly and approximately 720 (180x4) monthly. These patients make at least once monthly visits and a total of twelve visits in a year except when otherwise stated by the attending physician. The number of elderly patients from which the respondents were recruited was at least 720 per month.

2.2 Study Design and Data Collection Method

A cross sectional hospital based study was carried out among 370 patients aged 60 years and above attending a Tertiary Hospital from September to November 2017. A systematic random sampling technique was used and a sampling interval was calculated. For the period of three months, 2160 elderly patients were seen in the Geriatric (outpatient) clinic, of the GPC, UBTH. The 1st respondent was selected by simple random sampling method using balloting from the first 6 elderly patients. Case notes of the recruited respondents were labelled daily to avoid re-recruitment. Using a sampling frame from the attendance for each day, the respondents were recruited using serial number allotted to each of them. The minimum sample size of 370 was determined using the sample size for estimating single proportions assuming the prevalence of peripheral artery disease in the elderly in a study done in South West Nigeria (38.2%) [18] a type 1 error of 5% and precision of 5%. An interviewer administered, pretested semi-structured questionnaire. Section 1 consisted of the socio-demographic characteristics of the respondents, Section 2 was made up of relevant clinical information such as presence of comorbidities i.e. history of hypertension, diabetes, social history e.g. smoking, and alcohol etc. Section 3 consisted of history of intermittent claudication using Edinburgh Claudication Questionnaire (ECQ) while Section 4 included anthropometric and clinical parameters such as weight, height, BMI, blood pressure measurement, loss of skin appendages, foot ulcers, absence or presence of pedal pulses, hand-held Doppler scan was used to assess the ABI. Subjects with symptomatic PAD were those with intermittent claudication and ABI of <0.90 while those with asymptomatic PAD did not have above symptom but had an ABI of <0.9 [19]. Section 5 consisted of Laboratory data of patients viz: fasting blood glucose (FBG), fasting serum lipid profile. Pre-Testing Questionnaires: The Questionnaires were pre-tested in the General Out Patient Department (GOPD), of Irrua Specialist Teaching Hospital, Irrua, Edo State for clarity and consistency. These respondents were not used for the study.

2.3 Study Design and Protocols

Recruitment was done from September to November 2017. Respondents were interviewed to obtain information on their demographic data such as age, gender, smoking, alcohol intake and clinical characteristics [20]. Measurement of Blood Pressure: An Accosson® mercury sphygmomanometer was used in measuring the brachial and ankle blood pressure of each respondent. Measurement of the ABI was done using a hand-held Doppler (HadecoSmartdop 45, made in Japan). Measurement of the Toe-Brachial Index was done using hand-held Doppler (HadecoSmartdop 45, made in Japan) with its photo plethysmograph probe was used to measure the toe pressure.

A digital weighing scale: Hanson's Bathroom weighing scale manufactured by Jindal Medical and Scientific Instrument Company Limited, New Delhi, India with an (accuracy of ±100 g) was used to measure the body weight. The weight of each study subject was measured using the above weighing scale with the subjects standing still in the centre of the weighing scale's platform. Weights were recorded to the nearest 0.5 kg. The height was measured with a stadiometer to the nearest 0.1 cm with the subject barefooted. The body mass index was calculated from these values (weight and height) as a ratio of the measured weight to the square of the measured height in meters (kg/m^2).Waist circumference was measured using a metric non-stretch measuring tape placed midway between the inferior margin of the lowest rib and the iliac crest

in the horizontal plane, at the end of normal expiration.

2.4 Measurement of Blood Pressure

An Accosson® mercury sphygmomanometer was used in measuring the brachial and ankle blood pressure of each respondent. An appropriate sized cuff (the bladder length of 80% of patient's arm circumference and an ideal width of at least 40% as recommended by the American Heart Association). The blood pressure of the participants was also checked on the left arm in sitting position; two readings were taken 5 minutes apart and the average of the two readings taken as the participants' blood pressure. The cuff was placed on the upper arm and inflated while the radial pulse was being palpated. The cuff was inflated to 10 mmHg above the pressure at which the radial pulse was abolished, with the aid of a stethoscope placed over the skin overlying the brachial artery in the cubital fossa. The first sound (first Korotkoff sound) heard on gradual deflation of blood pressure cuff at 2mmHg per decline was taken as the systolic pressure while the diastolic pressure was taken as the point in which the sound became muffled (as the Korotkoff sound).

2.5 Measurement of the Ankle Brachial Index (ABI)

A hand-held Doppler (Hadeco Smartdop 45, made in Japan, See Fig. 1) was used to measure the ankle and brachial blood pressures. The procedure was explained to the patient who thereafter lay supine and calmly on a couch for about 5 minutes. Thereafter, the following procedures were carried out – measurement of brachial systolic blood pressure.

An appropriate sized cuff was placed around the upper arm and the brachial artery was located by palpation following which contact gel was applied on the skin over the artery.

The Doppler probe was applied at 45 degrees to the artery and the probe was moved until a good signal is obtained. The previously applied cuff was then inflated to abolish the Doppler signal and then slowly deflated to get the pressure at which the signal returns.

A similar procedure was repeated on the other arm and the higher of the two values obtained on the assessment of the two arms was taken as the brachial blood pressure.

2.6 Laboratory Investigation

Blood samples were collected from patients after an overnight fast for Fasting Blood Glucose (FBG) and serum lipid assay. FBG was done immediately using Quanth® glucometer (normal value was 70-126 mg/dl). Blood samples for serum lipid was sent immediately to the laboratory in plain bottles and sent to the chemistry laboratory where it was refrigerated at <30°C until analysis. The fasting serum lipid profile was analyzed using Randox kit result based on UBTH reference ranges for adult Nigerian. There are four categories within the profile: Total cholesterol (92-180 mg/dl), Low density lipoprotein (77-130 mg/dl), High density lipoprotein (20-60 mg/dl), and Triglycerides (19.2-77 mg/dl).

Serum cholesterol determined using the following procedure.

Three sets of tests tubes (curvettes) were used: one labelled as 'reagent blank', the second one is the 'standard', while the third is the 'sample' test tube. 1000 µl each of the reagent is added into each test tube. Then, 10 µl of distilled H_2O is added into the 'reagent blank' test tube, 10µl of standard solution is added to the 'standard' and l0 µl of sample is added to the 'sample' test tube. Each test tube is then mixed and incubated for 5 mins at 37°C.

Thereafter, the absorbance (A) of the sample (A_{sample}) is measured against the reagent 'blank' within 60 min. Concentration of cholesterol in sample was calculated using the formula:

$$\text{Concentration of cholesterol in sample} = \frac{AA_{sample} \times \text{Conc of standard}}{AA_{standard}}$$

2.7 Triglyceride Assay

The triglycerides are determined after enzymatic hydrolysis with lipases. The indicator is a quinoneimine formed from hydrogen-peroxide, 4-aminophenazone and 4-chlorophenol under the catalytic influence of peroxidase.

2.8 Data Management

Analysis was done using the statistical package for social science (SPSS) version 21.0 (Chicago, IL, USA). Categorical variables such as gender and marital status were summarised using frequencies and percentages. Numerical data such as age, duration of hypertension, diabetes

and smoking were represented using mean and standard deviation if normally distributed, while the median and range was used for data that are not normally distributed. The Chi-square test was used to determine the statistical association between categorical variables while logistic regression was used to determine significant predictors. Statistical significance was set at $p<0.05$.

3. RESULTS

Mean age of the respondents was 69.3±7.4 years SD and 29.2% of them were of age range 65-69 years constituting the highest frequency Table 1. Most of the respondents (76.5%) were female and 50% of the total respondents were married. The highest proportion of total respondents (42.2%) had primary education while the majority of respondents were Christians Table 1.

The association between PAD, socio-demographic factors and lifestyle variables are shown in Table 2. PAD was significantly higher among females (p=0.045) and among those with no formal education (p=0.010). Age and marital status were not significantly related to PAD Smoking status, alcohol use and BMI were not found to have statistically significant association with PAD (p=0.920, p=0.765, p=0.350 respectively).

Table 3 shows that hypertension and diabetes were not significantly associated with PAD (p=0.082 and p=0.102). Also, dyslipidemias (total cholesterol, low density lipoprotein, high density lipoprotein and triglycerides) were not significantly related to PAD (p=0.320, p=0.567, p=0.884, p=0.218 respectively).

In Table 4, two logistic regression models were carried out (unadjusted and adjusted logistic regression model). The unadjusted regression model indicated that males were less likely to presented with PAD than females (OR=0.589, 95% CI=0.35-0.992, p=0.047). Those with no formal education were more likely to present with PAD than those with tertiary education (OR=2.098, 95% CI=1.073-4.1, p=0.03). Respondents with poor foot appearance were more likely to have PAD than those with good foot appearance (OR=2.315, 95% CI=1.2-4.465, p=0.012). Respondents with abnormal pedal pulse were very likely to present with PAD than those with normal pedal pulse (OR=7.809, 95% CI=2.571-23.721, p<0.0001).

Table 1. Socio-demographic characteristics of respondents

Variables	Frequency n=370(%)	Percentage
Age (years)		
60-64	106	28.6
65-69	108	29.2
70-74	73	19.7
75-79	43	11.6
80 and above	40	10.8
Sex		
Male	87	23.5
Female	283	76.5
Marital Status		
Married	185	50.0
Single	1	.3
Divorced	2	.5
Separated	8	2.2
Widower/widow	174	47.0
Educational Status		
None	126	34.1
Primary	156	42.2
Secondary	33	8.9
Tertiary	55	14.9
Christianity	360	97.3
Islam	2	.5
Traditionalist	8	2.2

Table 2. Relationship between PAD, socio-demographics and lifestyle variables among the elderly attending the general practice clinic, Benin City, Nigeria

Variable	Absent (n=230)	Present (n=140)	Total	Chi square	P value
Age (years)					
60-64	68(64.2)	38(35.8)	106	3.27	0.195
65-69	73(67.6)	35(32.4)	108		
70+	89(57.1)	67(40.4)	156		
Gender					
Male	62(71.3)	25(28.7)	87	4.01	0.045
Female	168(59.4)	115(40.6)	283		
Marital status					
Married	120(64.9)	65(35.1)	185	1.48	0.224
Widowed	102(58.6)	72(41.4)	174		
Educational level					
None	65(51.6)	61(48.4)	126	11.43	0.010
Primary	101(64.7)	55(35.3)	156		
Secondary	26(78.8)	7(21.2)	33		
Tertiary	38(69.1)	17(30.9)	55		
Ever smoked cigarette					
Yes	3(40.0)	2(40.0)	5		0.626 (FET)
No	227(62.2)	138(37.8)	365		
Ever taken alcohol					
Yes	24(60.0)	16(40.0)	40	0.09	0.765
No	206(62.4)	124(37.6)	330		
BMI					
Underweight	15(78.9)	4(21.1)	19	3.53	0.317
Normal	91(64.1)	51(35.9)	142		
Overweight	77(57.9)	56(42.1)	133		
Obese	47(61.8)	29(38.2)	76		

FET – Fisher's exact test

Table 3. Relationship between co-morbid factors and PAD in the study population

Variables	Peripheral artery disease			χ^2	p-value
	Absent n=230(%)	Present n=140(%)	Total n=370(%)		
Hypertension					
No	79(68.7)	36(31.3)	115(100.0)	3.028	0.082
Yes	151(59.2)	104(40.8)	255(100.0)		
Diabetes					
No	180(64.5)	99(35.5)	279(100.0)	2.672	0.102
Yes	50(54.9)	41(45.1)	91(100.0)		
Total Cholesterol					
Normal	175(63.6)	100(36.4)	275(100.0)	0.990	0.320
Abnormal	55(57.9)	40(42.1)	95(100.0)		
Low Density Lipoprotein					
Normal	208(62.7)	124(37.3)	332(100.0)	0.328	0.567
Abnormal	22(57.9)	16(42.1)	38(100.0)		
High Density Lipoprotein					
Normal	200(62.3)	121(37.7)	321(100.0)	0.021	0.884
Abnormal	30(61.2)	19(38.8)	49(100.0)		
Triglycerides					
Normal	185(63.8)	105(36.2)	290(100.0)	1.517	0.218
bnormal	45(56.3)	35(43.8)	80(100.0)		

Finally, Table 5 represent a multivariate logistic regression model. The four significant variables from the unadjusted logistic regression model were then included into the adjusted logistic regression model Table 5. After adjusting for these variables, only abnormal pedal pulse was still significant (OR=10.634, 95%CI=2.4-47.12, p=0.002). This means that those with abnormal foot pulse were 10.6 times more likely to present with PAD than those with normal foot pulse.

4. DISCUSSION

In this study, the prevalence of PAD was higher among females and those with no formal education. The higher prevalence among women could be due to a combination of hormonal differences between males and females and a higher risk of cardiovascular risk factors such as sedentary lifestyle, high fat diet and higher lipid levels [11]. Additionally, the relatively lower educational status among women in low resource countries such as Nigeria compared to men could influence lifestyle and health seeking behaviour that ultimately increase the risk of disease such as PAD [21]. Education plays an important role in the choices people make including health promoting behaviours and practices and that could explain why elderly subjects in this study with lower education had increased PAD risk.

The higher PAD among women has also been reported by Subramaniam et al. [10] and Desormais et al. [7]. However, Ishida et al. in Japan and Ashis et al. in South Africa found a lower prevalence in women [4,22]. By contrast, Weragoda et al. and He et al. found no significant difference between males and females [8,9].

The higher PAD found among females and individuals with no formal education should guide any interventions aimed at preventing PAD or early identification of the condition among elderly. Such interventions, whether in the hospital or community should focus more on women and those with lower educational status. The fact that individuals with lower educational status have the highest risk of PAD implies that additional health education may be needed given that lower educational status could imply poorer knowledge about healthy lifestyles. Moreover health education and counselling sessions should be designed in the local language and explained so those with little or no formal education can easily understand.

In this study, there was significant association between PAD and age, the highest proportion with PAD was found among those aged 80years and above. Similarly, other studies have found that PAD significantly increases with age [7,8,21].

There was also no significant association between PAD and BMI in this study. Although, the prevalence of PAD was found to be higher in overweight respondents than those with normal weight. There was also no significant association between PAD and alcohol use in this study despite the high PAD prevalence among respondents that consume alcohol, but Desormais et al. and Guerchet et al. found decreased risk for PAD in the case of regular alcohol consumption [3,7]. A partial explanation for the lack of association between alcohol use and PAD in this study could be relative, because of the small number of participants reporting alcohol use as they were occasional drinkers. The proportion of alcohol and tobacco use is generally lower in Nigeria compared to other low resource and developing nations [23].This relationship is important considering the inflammatory effect of tobacco and alcohol on arteries (e.g activation of pro-inflammatory cytokines like; tumour necrosis factors (TNF), interlukin -1Beta, etc.) thus worsening endothelial dysfunction as well the clinical state of PAD in affected persons [1,2,11].

The significantly increased risk of PAD found among diabetic patients in some reported studies that has been reported was not found in the present study [24,25]. Adeko et al. in another Nigerian study found a significantly higher prevalence of PAD among non-diabetics compared to no diabetics [18]. Other studies have reported a significant association between PAD and diabetes including Weragoda et al. [8] among Sri Lankan adults, Tekin et al. [12] among Turkish elders, Subramaniam et al. [10] among older adults in a multi-ethnic Asian population. In these latter studies which showed a significant association between PAD and diabetes, hypertension was also significantly associated with PAD. However, there was no significant association in the present study despite the high prevalence of PAD among diabetic respondents. This could be attributed to the fact that majority of the diabetic and hypertensive respondent had good glycemic and blood pressure control. Another reason could be that these respondents have been on antiplatelet agents such as

clopidogrel and vasoprin which are useful in preventing the progression of PAD. A significant association was found by Escobar et al. [26] among Spanish adults with hypertension and Desormais et al. [7] had similar findin in rural Central Africa [7]. Martha et al. found that the prevalence of PAD was significantly higher among persons co-existing with hypertension and diabetes (57.6%) compared with persons with hypertension only (37.5%) [25]. In our study, the definitive diagnostic methods were not usedfor diagnosis of diabetes and that could explain the failure to find a significant association.

There was no association between lipid abnormalities and PAD. However other studies have shown a significant association. Subramaniam et al. found a significant association only for HDL-Cholesterol but no association between PAD and LDL-C and triglycerides [10]. Eraso et al. [27] and Desormais et al. [7] also found a significant association between PAD and hypercholesterolemia.

Table 4. A univariate logistic regression model showing only significant predictors of peripheral artery disease

Predictors	P-value	Unadjusted odds ratio	95% C.I. for EXP(B)	
			Lower	Upper
Sex				
Female*		1		
Male	0.047**	0.589	0.350	0.992
Educational Status	0.011**			
None	0.030**	2.098	1.073	4.100
Primary	0.559	1.217	0.629	2.354
Secondary	0.325	0.602	0.219	1.655
Tertiary*		1		
Foot Appearance				
Poor	0.012**	2.315	1.200	4.465
Good*		1		
Peripheral Pulse of the foot				
Abnormal	<0.001**	7.809	2.571	23.721
Normal*		1		

*R^2 (co-efficient of determination) = 8.2% - 11.2%, *Reference category*
**Statistically significant*

Table 5. Predictors of peripheral artery disease (Logistic regression)

Predictors	P value	Adjusted odds ratio	95% C.I. for EXP(B)	
			Lower	Upper
Sex				
Female*		1		
Male	0.312	0.73	0.410	1.330
Educational Status				
None	0.102	1.830	0.886	3.779
Primary	0.567	1.224	0.613	2.442
Secondary	0.259	0.540	0.185	1.574
Tertiary*		1		
Foot Appearance				
Poor	0.641	0.788	0.290	2.141
Good*		1		
Peripheral Pulse of the foot				
Abnormal	0.002**	10.634	2.400	47.121
Normal*		1		

*R^2 (co-efficient of determination) = 8.2% - 11.2%, *Reference category*
***Statistically significant*

The unadjusted logistic regression in this study indicated that males were less likely to present with PAD than females. It was also found that those with no formal education, abnormal pedal pulse and poor foot appearance were more likely to present with PAD. However, the adjusted logistic regression indicated that only those with abnormal pedal pulse were found to be a significant predictor of PAD. This is similar to the findings from a study done by Makdisse et al. which indicated that patients with abnormal pedal pulses had a significantly higher prevalence of PAD than those with normal foot pulse [21].

However a pattern was still identified among the non-significant variables. For example, although no longer statistically significant, females were more likely to present with PAD than males. A similar trend was found in a study by Subramaniam et al. in a multi-ethnic Asian population, which reported that females had a higher prevalence of PAD than males [10]. Similarly, Okello et al. found higher PAD prevalence among diabetic females [28]. The high prevalence of PAD among females in this study group could be attributed to the fact that Okello's study focused on diabetic adults which is a predisposing factor for PAD while this study focused only the elderly whereby some presented with multiple co-morbidities. However, previous studies indicated a higher PAD prevalence in males than females [8,9].

Furthermore, PAD was less present in the obese participants compared to the finding in the participants with normal weight. This deduction was in agreement with the findings in another study, where there was paradox relationship between obesity and the occurrence of PAD [29].

The study also found out that respondents with no formal education or only primary education were more likely to present with PAD than those with tertiary education. This is similar to previous findings which reported higher PAD prevalence among those without tertiary education [30,31].

Those with poor foot appearance were less likely to present with PAD than those with good foot appearance. This inconsistency found among respondents with poor foot appearance could be attributed to other external factors such as congenital defects, injuries and infectious processes. Generally, the effects of PAD on patients' quality of life cannot be over emphasized, as other studies on PAD Have significant association between PAD and patient quality of life. [32,33]

5. CONCLUSION

The prevalence of PAD using ABI was 37.8%, with female gender and low educational status being significant risk factors. Clinical examination of the foot revealed that an abnormal ABI was more among those with abnormal foot pulses. The result elicited that those with abnormal pedal pulse are 10 times more likely to present with PAD than those with normal foot pulse. It is therefore imperative that screening for PAD via clinical foot examination, use of ECQ and ABI where it is available be done to achieve early detection and facilitate prompt treatment.

6. STUDY LIMITATION

Since the study participants were taken only from a single out-patient clinic, the findings may not represent that of the general out-patient clinic population. The use of color Doppler ultrasonography for detection of PAD would have been used to improve the diagnosis of the disease, as it remains one of best imaging technique for detecting PAD without any side effects.

CONSENT AND ETHICAL CONSIDERATION

Ethical clearance with a protocol number ADM/E22/A/VOL.VII/1460 was obtained from the ethics committee of University of Benin Teaching Hospital [20]. All participants were educated on the purpose and benefits of the study before recruitment. Their participation in the study was totally voluntary and unwillingness to participate was without prejudice [20]. Their confidentiality was ensured as no name was included in the questionnaire. The hardware for the storage of data was pass-worded to prevent unauthorized access [20]. Written informed consent was obtained from each patient.

What is known about this topic

- A study conducted in urban and rural populations of Central Africa reported a prevalence of 14.8% among the elderly population [7], but no such data for elderly population in Nigeria.
- The prevalence has been found to be higher in blacks and blacks are most likely to present with PAD than other ethnic group [1,12].
- Reports from other studies indicated that patients with abnormal pedal pulses had a

significantly higher prevalence of PAD than those with normal foot pulse [21].

What this study adds

- This is the first study on PAD with focus only on the elderly population in Nigeria, this study will create awareness on the prevalence of PAD among physicians and stirs up the need to in cooperate its screening as part of comprehensive geriatric assessment.
- Hence, there is no gainsay that this study will provide the basic information on the predictors of PAD among the elderly and influence policy decisions on need for routine screening to curb the associated complications.

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COMPETING INTERESTS

The authors declare that they have no competing interests

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