COLLEGE OF HEALTH SCIENCES

SCHOOL OF MEDICINE

DEPARTMENT OF SURGERY

AWARENESS OF PERIPHERAL ARTERY DISEASE AND ASSOCIATED FACTORS AMONG PATIENTS AT TIKUR ANBESSA SPECIALIZED HOSPITAL

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ADDIS ABABA, ETHIOPIA

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A RESEARCH THESIS TO BE SUBMITTED TO ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES SCHOOL OF MEDICINE DEPARTMENT OF SURGERY IN PARTIAL FULFILLMENT OF THE REQUIREMENT FOR THE SUBSPECIALITY CERTIFICATE IN VASCULAR AND ENDOVASCULAR SURGERY.

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Full title of the research project	Awareness of peripheral artery disease and associated factors among patients at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia
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DECLARATION

I, the undersigned, declare that the thesis comprises my own work. In compliance with internationally accepted practices, I have acknowledged and refereed all materials used in this work. I understand that non-adherence to the principles of academic honesty and integrity, misrepresentation/ fabrication of any idea/data/fact/source will constitute sufficient ground for disciplinary action by the college and can also evoke penal action from the sources which have not been properly cited or acknowledged.

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ABBREVIATIONS

ALS	Amyotrophic Lateral Sclerosis
CAD	Coronary Artery Disease
CI	Confidence Interval
CLI	Critical Limb Ischemia
CV	Cardiovascular
CVS	Cardiovascular System
CVA	Cerebral Vascular Accident
CVD	Cardiovascular Diseases
DM	Diabetes Mellitus
MI	Myocardial Infarction
OPD	Outpatient Department
OR	Odds Ratio
PAD	Peripheral Arterial Disease
TASH	Tikur Anbessa Specialized Hospital

ABSTRACT

Background: Peripheral artery disease (PAD) is a common condition among individuals aged 55 and older, significantly impacting cardiovascular health and quality of life. Despite its prevalence, PAD remains underdiagnosed due to low public awareness, which can delay treatment and increase morbidity.

Methods: This study evaluated PAD awareness and its associated factors among patients at Tikur Anbessa Specialized Hospital in Addis Ababa. The study employed a hospital-based cross-sectional design from January 20 to March 30, 2024. A sample of 405 adult patients were selected using simple random sampling, and data were gathered through a pretested, Amharic-translated questionnaire. Analysis was performed using SPSS version 28, with descriptive statistics and logistic regression applied.

Results: Only 11.5% of males and 10.4% of females are aware of Peripheral Arterial Disease (PAD). Awareness is higher among those aged 40-55 (12.2%) and with secondary education (16.3%), with urban residents (12.2%) being more informed than rural ones (4.4%). In contrast, awareness of major conditions like diabetes (98.5%) and hypertension (99.0%) is much higher. Friends (52.3%) and family (22.7%) are the primary sources of PAD information. Many respondents (61.4%) did not recognize any of PAD risk factors, though some identified diabetes, smoking, and high blood pressure. Commonly recognized symptoms include numbness (47.7%) and intermittent claudication (38.6%). The most cited consequence of untreated PAD is the inability to walk (59.1%). Multivariate analysis found that awareness of stroke and abdominal aortic aneurysm (AAA) are significantly associated with higher levels of self-reported PAD awareness. Specifically, individuals aware of stroke have an adjusted odds ratio (AOR) of 3.6 (95% CI: 1.1-14) and those aware of AAA have an AOR of 3.5 (95% CI: 1.1-11), both with p-values of 0.03, indicating significant associations.

Conclusions: The study highlights a significant gap in PAD awareness, which varies by demographic factors such as age, education, and residence. To address this issue, targeted educational interventions are recommended, focusing on older adults and less educated populations, to improve early diagnosis and management of PAD. Further studies with a wider population are needed to confirm the findings' reliability and address potential biases.

CHAPTER ONE: INTRODUCTION

1.1. Background

Peripheral artery disease (PAD) is atherosclerotic or non-atherosclerotic stenosis or occlusion of the aorta, lower and upper extremity arteries (1)(2). In this article, the term "peripheral artery disease" will refer to vascular conditions resulting from atherosclerosis affecting the abdominal aorta, iliac arteries, and lower-extremity arteries, which cause stenosis or occlusion (2). PAD is highly prevalent, affecting 11 to 29% of the population aged 55 or older and as many as 8 million Americans and 800 000 Canadians(3) (4)(5).

The prevalence of PAD in sub-Saharan Africa could be as high as or even surpass that found in high-income countries, potentially exceeding 50% among certain high-risk groups (6). studies done in Ethiopia showed a prevalence of 10.8% in a community-based study in Jimma and about 30.7% in diabetic patients in a Debre Tabor hospital-based study (7) (8).

PAD accounts for 34.2% of cases seen at the vascular clinic at Tikur Anbessa Specialized Hospital, of those, 34.8% presented with either frank Gangrene or pre-gangrene stage (9). Patients with PAD may face various complications, including claudication, ischemic rest pain, ischemic ulcers, frequent hospitalizations, revascularization procedures, and potential limb loss. These issues can significantly impair their quality of life and contribute to elevated levels of depression (2).

Given the systemic nature of atherosclerosis, patients with PAD are at high risk for developing cardiovascular (CV) events such as myocardial infarction, stroke, and cardiovascular death. It is associated with significant overall mortality, 30% within 5 years and 50% at 10 years, primarily from myocardial infarction or stroke (10) (4) (5).

PAD is one of the most common cardiovascular diseases in developed countries and is an emerging problem in developing countries but underdiagnosed, undertreated, poorly understood, and much more common than previously thought (2) (11)(12)(13).

Therefore, establishing the diagnosis of PAD can lead to improved symptoms in claudicants, and also holds the potential to prevent future cardiovascular morbidity and mortality in these high-risk patients through early identification and treatment of risk factors(4)(5).

PAD is a growing public health burden. The development and progression of PAD are influenced by vascular risk factor management and lifestyle changes. However, public awareness of PAD is low compared with other conditions such as heart disease and stroke, which have been the subject of widespread public health campaigns (12).

Numerous studies consistently reveal a lack of public awareness regarding PAD, indicating significant knowledge deficiencies in understanding PAD's definition, the risk factors contributing to its development, and the associated symptoms leading to limb issues and amputation risks. Additionally, there is a general lack of awareness among the public regarding the elevated short-term risks of heart attacks, strokes, and mortality associated with PAD. In Sri Lanka, the awareness of PAD is notably limited, standing at 4.1%. In contrast, studies conducted in the United States, Canada, Ireland, the Netherlands, and Saudi Arabia indicate awareness rates ranging from 19% to 35%. Conversely, self-reported awareness in Hong Kong is relatively higher, at approximately 63% (14)(10)(5)(15)(16)(11).

1.2 Statement of the Problem

PAD is a growing public health burden with a prevalence of 12-29% in the adult population. Yet it is underdiagnosed, undertreated, poorly understood, and much more common than previously thought. Patients with PAD may present with varied clinical presentations, including no symptoms, atypical leg pain, claudication, ischemic rest pain, ischemic ulcerations, gangrene, or limb loss (3)(4)(5).

PAD, owing to its systemic nature, both asymptomatic and symptomatic patients are at increased risk of CV morbidity and mortality. Patients with symptomatic PAD have at least a 30% risk of death within 5 years and 50% within 10 years, resulting primarily from myocardial infarction or stroke (5). Only 50% of patients with critical limb ischemia will be alive with 2 limbs after 1 year of diagnosis, 25% will end up with major amputation and the other 25% will die of CV causes (2).

Various research consistently showed the public is poorly informed about PAD, with major knowledge gaps regarding the definition of PAD, risk factors that lead to PAD, and associated limb symptoms and amputation risk. The public is also not aware that PAD imposes a high short-term risk of heart attack, stroke, and death (3).

Lack of public PAD awareness poses a major challenge for early diagnosis and adequate treatment of PAD and its risk factors which in turn results in significant morbidity and mortality as a result of PAD (13). Public PAD knowledge could be improved by national PAD public education programs designed to reduce critical knowledge gaps but first, we need to identify the specific knowledge gap and specific segment of the population, so that we can provide targeted public education (3).

The recent introduction of vascular surgery practice in Ethiopia presents an opportunity to assess the baseline awareness of PAD and develop targeted educational campaigns. A lack of awareness can contribute to underdiagnosis, delayed treatment, and increased morbidity and mortality associated with PAD.

1.3. Significance of the study

Studying awareness surrounding Peripheral Artery Disease (PAD) is crucial due to its prevalent yet underdiagnosed nature. Despite affecting a significant portion of the population, PAD often goes unrecognized, leading to under-treatment and a heightened risk of severe cardiovascular events. By investigating awareness gaps, we can identify factors contributing to this discrepancy, develop targeted educational interventions, and enhance early detection strategies. Ultimately, improved awareness can lead to timely interventions, and better management, and potentially reduce the burden of PAD-related complications, thereby enhancing overall cardiovascular health outcomes.

To the best of our knowledge, no study in Ethiopia assessed the awareness level of PAD and its associated factors, so our study will be a baseline data to determine the current level of PAD awareness and identify specific areas of the knowledge gap and help develop targeted public awareness programs.

CHAPTER TWO: LITERATURE REVIEW

PAD Definition, Epidemiology and Risk Factors

In this article, the term "peripheral artery disease" will refer to vascular conditions resulting from atherosclerosis affecting the abdominal aorta, iliac arteries, and lower-extremity arteries, which cause stenosis or occlusion (2). Atherothrombosis, which includes peripheral artery disease (PAD), coronary artery disease, and cerebral artery disease, is the number one cause of mortality in the world (10).

Peripheral artery disease (PAD) is often underdiagnosed, undertreated, and less understood than previously believed, despite its higher prevalence. In primary care settings throughout the United States, it has been reported that 29% of patients aged over 70, or those over 50 with a history of smoking or diabetes, have PAD (2).

Around 12% of adults are affected by peripheral artery disease (PAD), with similar prevalence rates among men and women. The risk of PAD increases with age, with nearly 20% of individuals over 70 years old showing signs of the condition (2)(16).
The most common risk factors associated with PAD are increasing age, diabetes, smoking, hypertension, and dyslipidemia (2)(16)(5). Persons aged 65 years or older in the Framingham Heart Study and persons aged 70 years or older in the National Health and Nutrition Examination Survey (NHANES) were at increased risk for the development of PAD(2).

Smoking is the most significant modifiable risk factor for peripheral artery disease (PAD). Smokers are four times more likely to develop PAD compared to nonsmokers and tend to show symptoms nearly a decade earlier. Additionally, diabetes elevates the risk of both symptomatic and asymptomatic PAD by 1.5 to 4 times, and it is associated with a higher likelihood of cardiovascular events and premature death (2).

In the Framingham Study, high cholesterol levels were linked to a twofold increased risk of claudication. Hyperlipidemia elevates the adjusted risk of developing PAD by 10% for each 10 mg/dL increase in total cholesterol (2). Nearly all studies have demonstrated a robust link between hypertension and PAD, with hypertension present in 50% to 92% of PAD patients. Hypertension increases the risk of developing claudication by 2.5 to 4 times in both men and women (2).

Clinical presentation and complications

Patients with PAD may experience a range of symptoms, including classic claudication, atypical leg pain, rest pain, ischemic ulcers, or gangrene. Notably, up to 50% of individuals with PAD may be asymptomatic, while classic intermittent claudication is observed in 4.5% to 32.6% of PAD patients (2). Initial clinical presentation of PAD; asymptomatic PAD 20%-50%, Atypical leg pain 40%-50%, Claudication 10%-35%, critical limb ischemia (CLI), (which includes rest pain, ischemic ulcers, gangrene) 1%-2% (2).

Patients with PAD have a greater likelihood of experiencing a myocardial infarction (MI), stroke, and cardiovascular death and have a higher rate of all-cause mortality compared with patients without PAD. It is associated with significant overall mortality, 30% within 5 years and 50% at 10 years (2)(13)(10).

PAD also fosters major morbidity by causing claudication, functional impairment, disability, and amputation (13). Only 50% of patients with critical limb ischemia will be alive with 2 limbs after 1 year of diagnosis, 25% will end up with major amputation and the other 25% will die of cardiovascular causes (2). Of those PAD patients with no symptoms, atypical leg pain or claudication 70-80% will have stable claudication over the next 5-10 years. But they will have a 20% risk of non-fatal cardiovascular morbidities including stroke and MI and a 15-30% risk of death (2).

PAD Awareness

Awareness of a disease pathology generally refers to how well individuals understand and recognize the nature, causes, symptoms, and potential consequences of a disease. PAD, however, remains underrecognized, underdiagnosed, and undertreated. Approximately half of patients with PAD are asymptomatic, with typical symptoms present in only 20%.9 This may contribute to its underrecognition in primary care (10)(13).

The goals of therapy are to improve symptoms and thus quality of life by establishing a supervised exercise program and medical management or performing a revascularization procedure. And to decrease the cardiovascular event rate (myocardial infarction, stroke, cardiovascular death), by a

comprehensive program of cardiovascular risk modification (Discontinuation of tobacco use and control of lipids, blood pressure, and diabetes (2)(5).

A significant barrier to diagnosing and treating PAD is the lack of public awareness. When people at risk for PAD or those already affected are unaware of its key symptoms and signs, efforts to prevent serious, costly cardiovascular complications are hindered (13).

Management of PAD risk factors has been shown to be effective in controlling the disease and this has led to multidisciplinary recommendations of initiating cardiovascular risk reduction treatment targeted to PAD patients at risk (16). Public health education programs have been shown to improve knowledge and awareness of cardiovascular disease and risk factors and can account for some of the improved outcomes for cardiovascular disease (10). National public awareness campaigns have successfully contributed to the prevention, early detection, and treatment of many diseases (17).

Improvements in the diagnosis and treatment of hypertension in Canada following a Canadian Hypertension Education Program have served as one example of the benefits of such a campaign (10). The 1999 “Legs for Life” screening and awareness program administered by the Society of Interventional Radiology reported short-term improvements in awareness of PAD and management of risk factors (10).

In the United States, campaigns designed to increase awareness of heart disease risk among women have demonstrated measurable improvements (13). Atherosclerosis risk factors were highly prevalent among PAD patients; however, these individuals often received less aggressive treatment for lipid disorders and hypertension compared to those with cardiovascular disease. Additionally, PAD patients were prescribed antiplatelet therapy less frequently. These findings suggest that the underdiagnosis of PAD in primary care may hinder effective secondary prevention of the elevated ischemic cardiovascular risk associated with the condition (18).

PAD Awareness gap

In Ireland, a cross-sectional, tertiary hospital-based study by Cronin et al., 2015, the diagnosis of PAD is frequently overlooked, and the cardiovascular risk factors were not treated as appropriately as in patients with CAD(2) The study population demonstrated a high awareness of stroke (94%), coronary artery disease (78%), diabetes (98%), and bowel cancer (86%) in contrast, only 19% self-reported awareness of PAD (10).

This study demonstrates a disturbing lack of awareness of PAD and highlights the need for a meaningful targeted public health awareness campaign on PAD to close the gap of knowledge in Irish patients, prior to any prevention campaign (10).

In a cross-sectional study conducted at a tertiary hospital in Ireland, awareness of PAD was higher among individuals with post-secondary education. Female patients and those undergoing treatment for hypertension or hypercholesterolemia exhibited greater awareness of PAD. However, patients with known PAD risk factors—such as smokers, diabetics, and those with a history of cardiovascular disease treatment—did not show increased awareness of the condition (10).

In Canadian population-based stud; Awareness of PAD was low (35.5%) compared to awareness of stroke (71.7%), coronary artery disease (51.1%), and heart failure (47.9%) (13). PAD awareness was lowest in men (31.8%), adults 70 years of age and older (33.3%), and those with lower education levels (28.6%) and lower income (30.9%) (13). Among those who were "PAD aware," understanding of PAD risk factors was inadequate. Nearly half of them were unaware that diabetes could lead to PAD, and 41.6% did not connect smoking with the disease. Furthermore, 48.9% did not recognize that high blood pressure, and 51.4% were unaware that high cholesterol could cause PAD. Awareness of PAD's potential consequences was also limited among this group, with few associating it with stroke (21.3%), death (20.8%), heart attack (19.8%), or amputation (12.4%). Only 6.7% knew that PAD could lead to disability or reduced walking ability.

Regarding sources of information, broadcast or cable television was the most common source (25.3%), followed by family or friends (18.5%). Only a small number reported receiving information from physicians (13.5%), nurses (1.7%), or other healthcare professionals (1.7%) (13).

In a Saudi population-based cross-sectional study, only 34% of participants were aware of PAD. Among those familiar with PAD symptoms, 91% were unaware that the condition can be asymptomatic, and over half did not recognize that PAD might present as intermittent claudication (16). Moreover, except for high cholesterol, every PAD risk factor was identified by less than 45% of those who reported awareness of PAD risk factors.

The majority of participants with reported knowledge of preventative measures did not know that smoking cessation, diabetes, and hypertension control, as well as pharmacological therapy, are important in preventing PAD (16).

Female gender, those with higher education, and those aged 40 years or older were associated with greater awareness of PAD (16). In a Dutch national survey of the general population and patients by Willigendael et al., 2004; 25% classified PAD as a relatively innocent condition, 61% as relatively serious, 5% as very serious, and 9% did not know how to classify PAD at all. If suffering pain on walking which subsides when resting, 23% of the general population said they would visit a physician immediately, and a further 75% would go later, if the complaints persisted (5).

Female members of the general population were more aware of risk factors for developing PAD than their male counterparts. This was reversed in the patient population, suggesting that male patients received or perceived more information (5). A cross-sectional study in Hong Kong showed awareness of PAD was low (63%) compared with other CV risk factors and diseases such as hypertension (99.5%), diabetes (98.6%), hyperlipidemia (99.5%), coronary artery disease (CAD 93.5%) and cerebrovascular disease (CVD 97.8%,). 57-66% of participants were aware of CV complications including death, heart attack, stroke, and limb loss (14).

The American public showed a fairly high awareness of stroke (73.9%) and coronary artery disease (67.1%), but awareness of PAD was only 25%. Overall, public awareness of PAD was low across all groups, with the lowest levels typically observed among older individuals, males, nonwhite people, and those with lower education or income levels (3).

In this survey, a significant number of adults who were aware of peripheral artery disease (PAD) did not recognize that cigarette smoking (44%) and diabetes (50%) are major contributors to PAD. Over half of the respondents were also unaware that high blood cholesterol and high blood pressure

are risk factors for PAD. Conversely, obesity and lack of exercise, which do not have a direct causal link to PAD, were perceived as equally important causes of the disease as the well-established risk factors of diabetes and smoking (3).

Only 25% of people linked peripheral artery disease (PAD) with an increased risk of heart attack, 28% connected it to a higher risk of stroke, 14% associated it with a risk of amputation, and just 14% saw it as a risk for death. The main sources of PAD information were broadcast or cable television (26%), family members or friends (17%), and magazines (15%). Fewer PAD-aware individuals learned about the condition from healthcare professionals, with only 14% getting information from a physician, 2% from a nurse, 0.2% from a pharmacist, and 2.6% from other health professionals (3).

The key factors that significantly boosted awareness of peripheral artery disease (PAD) included awareness of other non-cardiovascular diseases (such as multiple sclerosis, cystic fibrosis, and ALS), having a higher level of education, knowledge of stroke and coronary artery disease, being female, and having a history of high blood pressure, coronary artery bypass surgery, or angioplasty (3).

Hospital-based study in Ireland by Keelan et al., 2020, demonstrates that overall patient knowledge of PAD is poor. It highlights the lack of awareness of PAD and the need for educational programs. Public health education should provide accurate information that fills known knowledge gaps. Additionally, PAD risk factors must be targeted (19).

Considering the total population, 77% and 71% correctly identified the contribution of smoking and limited exercise to the development of PAD respectively. Patients were less able to correctly identify diabetes (43%) as a risk factor for cardiovascular disease (12). Attendance at vascular clinic having never smoked, and being diagnosed with diabetes hypertension and/or hypercholesterolemia were found to be significantly associated with PAD awareness. Notably, third-level education was not associated with improved PAD awareness (12).

In Sri Lanka, the awareness of PAD was 4.1 %, which was significantly lower than that of CVA (67.3 %) and MI (57.6 %). being male, an urban resident, and having a higher education level were

independent predictors of high awareness of PAD (11). The majority of participants who were "PAD aware" knew that DM (64.0 %) and dyslipidemia (57.9 %) were risk factors for PAD. However, less than one-third of this group was aware that hypertension (31.6 %) and smoking (30.7 %) were risk factors for PAD, and less than 25 % were aware that CVA and MI were possible consequences of PAD (11). In this group, the main sources of information about PAD were physicians (39.5%) and family members or relatives (37.7 %) and only 10.5 % had received information from mass media such as newspapers, radio, and television (11).

All the studies consistently showed that awareness of Peripheral Arterial Disease (PAD) was notably lower compared to awareness of other cardiovascular diseases. Among those who were aware of PAD, knowledge about its risk factors, clinical presentation, and complications was very limited. Most research found that older age and lower levels of education are associated with reduced PAD awareness. Additionally, individuals with risk factors for PAD, such as diabetes, hypertension, and smoking, did not demonstrate increased awareness of the condition.

2.2 Conceptual framework

In developing the framework for this research on PAD awareness, a comprehensive approach has been adopted by integrating different factors identified in the literature. Socio-demographic factors such as age, gender, education level, and place of residence provide insights into the demographic and socio-structural determinants of health awareness. The framework incorporates patients' characteristics, including history of smoking, diabetes, hypertension, and high cholesterol. Additionally, the framework incorporates the importance of understanding risk factors, clinical manifestations, preventive measures, and complications of PAD to assess the knowledge of those who are aware of PAD. Synthesizing these diverse factors into an interconnected framework, this study aims to assess the multi-dimensional nature of PAD awareness (Figure *1*).

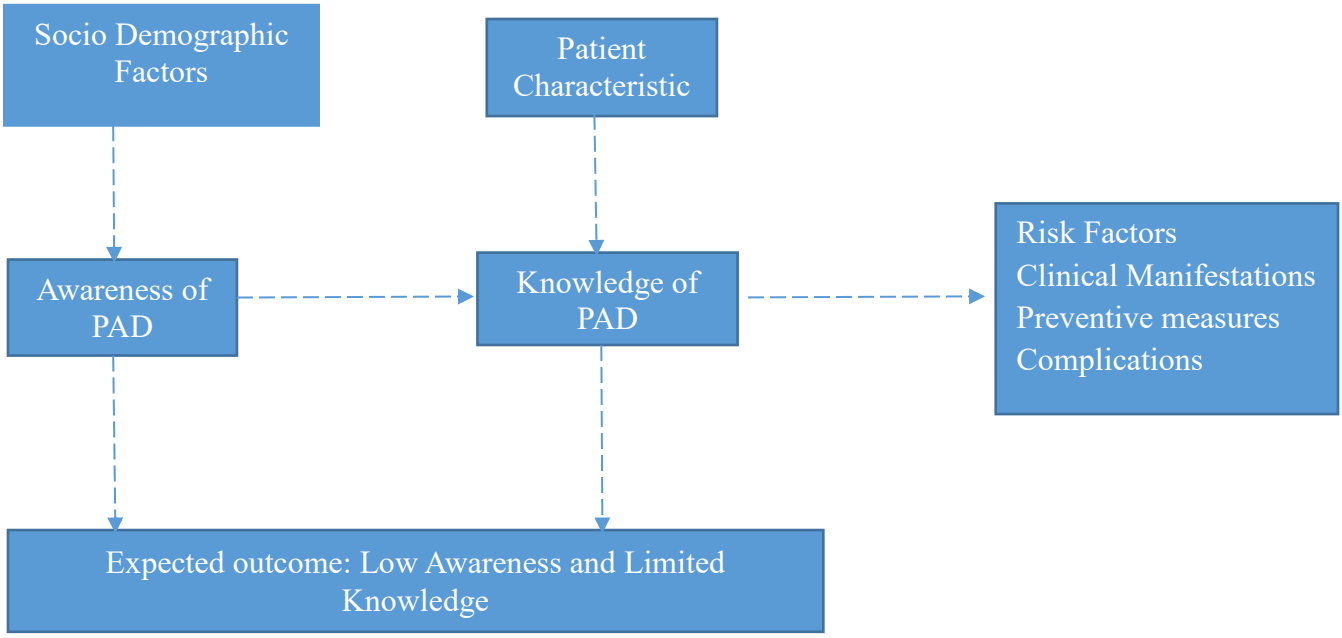

Figure 1. A conceptual framework for PAD awareness

CHAPTER THREE: OBJECTIVES

3.1. General objective

- To assess the awareness of Peripheral Arterial Disease and Associated Factors among Adult Patients at Tikur Anbessa Specialized Hospital, 2024.

3.2. Specific Objective

- To determine the level of self-reported awareness of PAD
- To determine factors associated with the level of awareness of PAD.
- To assess knowledge of risk factors for PAD
- To assess knowledge of clinical manifestation of PAD
- To assess knowledge of complications of PAD

CHAPTER FOUR: METHODS AND MATERIALS

4.1. Study Area and Period

The study was conducted in Tikur Anbessa Specialized Hospital (TASH), situated in the Lideta sub-city, Addis Ababa, Ethiopia. It was the country's largest referral hospital which had been established in 1972. It had over 800 beds and served more than half a million patients with diagnostic and treatment services annually. Moreover, TASH served as a critical institution providing specialized clinical services not readily available elsewhere in the public or private sectors, extending its reach to the entire nation.

As the primary teaching hospital for Addis Ababa University, it played a pivotal role in both clinical and preclinical training across various disciplines. It was a vital training ground for highly skilled undergraduate and postgraduate medical students, and other allied health science professionals. The collaborative efforts of departments, faculties, and residents specializing in the school of medicine contributed to delivering exceptional patient care within the hospital.

This study was conducted from January – August 2024.

4.2. Study Design

Hospital-based cross-sectional study design is implemented.

4.3. Population

4.3.1 Source Population

All patients who have a follow-up at Tikur Anbessa Specialized Hospital.

4.3.2 Study Population

All adult patients who visited the hospital’s outpatient department (OPD) during the data collection period.

4.4. Eligibility Criteria

4.4.1 Inclusion Criteria

Adult patients above the age of 40 years who visited the OPD during the study period were included.

4.4.2 Exclusion Criteria

- Patients who have already been diagnosed with peripheral arterial disease.
- Patients who are health professionals and
- Mentally ill patients were excluded from this study.

4.5. Sample Size Determination & Sampling Procedure

4.5.1 Sample Size Determination

The sample size was determined by using a single population proportion formula with a 95% confidence interval (CI) and a 5% margin of error. Since there was no previous prevalence finding reported sample proportion of 50% is used for sample size calculation.

$$N = \frac{z_{\propto/2}{}^2\ p\ (1-p)}{d^2}$$

Where, N = sample size

$z_{\propto/2}$= critical value (1.96 for 95% CI)

p = sample proportion (0.5)

d = margin of error (0.05)

$$N = \frac{1.96^2\ \ 0.5\ (1-0.5)}{0.05^2} = 384$$

Considering a 5% non-response rate;

Final sample size = $\frac{\text{N}}{\text{Expected response rate}} = \frac{384}{0.95} = 405$

Thus, the sample size for this study is **405.**

4.5.2 Sampling Procedure

A simple random sampling method was used to select participants for this study. This method ensures that every individual in the target population has an equal chance of being selected, thereby reducing selection bias and enhancing the representativeness of the sample.

4.6 Operational Definitions

- Self-reported Awareness: if the patient read or heard about the term “PAD” or “ stenosis or occlusion of leg arteries”
- PAD: vascular diseases caused by atherosclerosis of the abdominal aorta, iliac, and lower-extremity arteries leading to stenosis or occlusion.

4.7. Study Variables

4.7.1 Dependent Variables

Awareness of PAD
Knowledge of risk factors for PAD
Knowledge of clinical manifestation of PAD
Knowledge of complications of PAD

4.7.2 Independent Variables

- Age
- Sex
- Level of education
- Place of residence
- History of smoking
- History of Diabetes
- History of Hypertension
- History of High cholesterol

4.8. Data Collection Procedure

A pretested, interview-administered questionnaire was used as a data collection tool. The tool was developed based on an extensive literature review and was checked by other experts in the field for additional feedback. The final questionnaire was translated into Amharic and was pretested on 30 patients. Eligible participants were randomly approached at the waiting area of the outpatient department. The data were collected by medical interns working at OPD.

4.9. Data quality assurance and management

To ensure the quality of the data, both data collectors and supervisors underwent a three-day training before the commencement of data collection. Throughout the data collection process, the supervisors and principal investigator conducted daily reviews of the collected questionnaires to ensure completeness and clarity. Feedback was promptly communicated to the data collectors for necessary adjustments. Data were then coded, entered into a computer, cleaned, and frequency checked for outliers and missing values before analysis.

4.10. Data Entry & Analysis

The data were cleaned, and double-entry verification was employed in Epi Data to ensure accuracy and completeness. Then, the data were exported to SPSS version 28 for analysis.

Descriptive findings were presented through frequencies, percentages, and summary statistics. Participants were categorized into those who were self-aware and those who were not. In the self-aware group, variables associated with a P-value < 0.25 in the binary logistic regression analysis were considered for inclusion in the multivariable analysis. The strength of the association between dependent and independent variables was expressed through the computation of odds ratios with a 95% confidence interval. The goodness of fit of the model was assured by the Hosmer and Lemeshow test, and the significance of associated variables was declared with a P-value < 0.05 in the multivariable analysis.

4.11. Dissemination of the result

The primary objective of this thesis is for partial fulfillment of the requirements for the certificate of sub-specialty in vascular and endovascular surgery; it will be presented and submitted to the Department of Surgery, School of Medicine, Addis Ababa University.

Furthermore, copies of the results will be provided to the relevant authorities to contribute to the enhancement of strategic and educational plans aimed at promoting awareness about peripheral arterial diseases. Additionally, efforts will be made to present the findings at professional, local, national, and international meetings, and to seek publication in peer-reviewed journals at the national or international level.

4.12. Ethical Consideration

Ethical approval was sought from the Ethical Review Committee of the School of Medicine at Addis Ababa University, College of Health Sciences. Subsequently, a letter of support was drafted by the Associate Dean's Office to secure permission and facilitate the study at the TASH Outpatient Directorate Office.

Before participating in the study, all prospective participants were asked in Amharic to give their informed consent either in written or oral form. The consent process involved providing them with comprehensive information about the study's purpose and what was expected from them. Additionally, participants were assured that any information they disclosed would be treated with the utmost confidentiality. To maintain confidentiality, the identifiers of study participants were omitted, and they were assigned unique code numbers.

CHAPTER FIVE: RESULTS

I. Socio-demographic characteristics

The study included 405 participants with a 100% response rate. Most participants were 40-55 years old (56.5%) and predominantly female (57.0%). Regarding education, 22% had no formal education, 25.2% completed primary school, 22.7% completed secondary school, and 30.1% had college education or higher. Most participants resided in urban areas (83.2%) (Table *1*).

Table 1. Socio-demographic characteristics of study participants at Tikur Anbessa Specialized Hospital, 2024 (n=405)

Characteristics	**Frequency**	**Percent**
Age		
40-55	229	56.5
56-70	138	34.1
>70	38	9.4
Sex		
Female	231	57.0
Male	174	43.0
Educational status		
No formal education	89	22
Completed primary school	102	25.2
Completed secondary school	92	22.7
College and above	122	30.1
Residence		
Urban	337	83.2
Rural	68	16.8

II. Clinical profile of the study participants

Hypertension was prevalent among 83.7% of males and 58.2% of females, with the highest occurrence in the age groups 56-70 (79.3%) and over 70 (80.6%). Among educational levels, those without formal education (76.7%) and residents in urban areas (85.7%) showed higher rates. High cholesterol affected 64% of males and 60.4% of females, with those over 70 experiencing the highest rates at 74.2%. This condition was more common among participants with secondary education (67.5%) and those living in urban areas (64.4%). Diabetes was reported by 43% of males and 46.2% of females, with the highest incidence in the age group over 70 (48.4%) and those with primary education (47.4%) (Table *2*).

Table 2. Clinical profile of the study participants by their sociodemographic characteristics at Tikur Anbessa Specialized Hospital, 2024, (n=405)

	Sex		**Age**		**Education**				**Residence**		
	M	F	40-55	56-70	>70	No formal	Primary school	Secondary school	College and above	Urban	Rural
Risk factors											
Hypertension	83.7	58.2	54.7	79.3	80.6	76.7	65.8	70	71	69.3	85.7
High cholesterol	64	60.4	57.8	61	74.2	60	57.9	67.5	62.3	64.4	35.7
Diabetes	43	46.2	51.6	37.8	48.4	40	47.4	42.5	46.4	47.9	7.1
Smoking											
Active smoker	1.1	0.4	0.9	0.7	0	0	0	1.1	1.6	0.6	1.5
Ex-smoker	20.7	1.7	5.7	13.8	21.1	3.4	5.9	13	15.6	10.1	8.8
Non-smoker	78.2	97.8	93.4	85.5	78.9	96.6	94.1	85.9	82.8	89.3	89.7
Treatment history											
Stent on the heart	11.5	0	4.8	2.9	9.1	5.8	2	5.3	4.8	5.1	0
Stroke	30.8	19.5	23.8	22.9	27.3	28.8	26	24.6	14.3	27.1	0
Heart attack	65.4	85.4	71.4	82.9	72.7	73.1	74	77.2	88.1	84.6	100

Regarding smoking, 1.1% of males and 0.4% of females were active smokers, while ex-smokers were predominantly male at 20.7%. Most participants were non-smokers, with 78.2% of males and 97.8% of females reporting never smoking. Treatment history showed that heart stents were most prevalent among males (11.5%) and the age group over 70 (9.1%), while strokes were more common among males (30.8%) and urban residents (27.1%). Heart attacks were experienced by 65.4% of males and 85.4% of females, with the highest rates in rural areas (100%) (Table *2*).

III. Awareness of different disease pathologies

The data reveals a high level of awareness about major health conditions among respondents, with 98.5% recognizing diabetes and 99.0% aware of hypertension. Heart attacks and breast cancer are also well-known, with awareness rates of 97.0% and 96.3%, respectively. In contrast, awareness of stroke is lower at 67.9%, and only 4.0% are familiar with abdominal aortic aneurysms. A very small percentage, just 1.0%, do not recognize any of the listed diseases (Table *3*).

Table 3. Awareness of different disease pathologies among the study participants at Tikur Anbessa Specialized Hospital, 2024, (n=405)

Disease	Frequency	Percentage of total cases
Diabetes	399	98.5
Hypertension	401	99.0
Stroke	275	67.9
Heart attack	393	97.0
Abdominal aortic aneurysm	16	4.0
Breast cancer	390	96.3
None of the above	4	1.0

IV. Self-reported PAD awareness

Regarding self-reported PAD awareness, 20 (11.5%) of male participants and 24 (10.4%) of female participants reported being aware of PAD. In terms of age, awareness was highest among participants aged 40-55, with 28 (12.2%) reporting awareness, followed by those aged 56-70 with 13 (9.4%), and those over 70 with 3 (7.9%). Education level showed that participants with secondary education had the highest awareness at 15 (16.3%), followed by those with college education at 18 (14.8%). In comparison, those with no formal education and those who completed primary school reported the lowest awareness at 6 (6.7%) and 5 (4.9%), respectively. Participants from urban areas reported higher awareness, with 41 (12.2%) being aware of PAD, compared to 3 (4.4%) from rural areas (Table *4*).

Table 4. Self-reported awareness of PAD by sociodemographic characteristics at Tikur Anbessa Specialized Hospital, 2024 (n=405)

Socio-demographic characteristics		**Self-reported PAD awareness**	
		Yes	**No**
Sex	Male	20(11.5)	154(88.5)
	Female	24(10.4)	207(89.6)
Age group	40-55	28(12.2)	201(87.8)
	56-70	13(9.4)	125(90.6)
	>70	3(7.9)	35(92.1)
Education level	No formal education	6(6.7)	83(93.3)
	Completed primary school	5(4.9)	97(95.1)
	Completed secondary school	15(16.3)	77(83.7)
	College and above	18(14.8)	104(85.2)
Residence	Urban	41(12.2)	296(87.8)
	Rural	3(4.4)	65(95.6%)

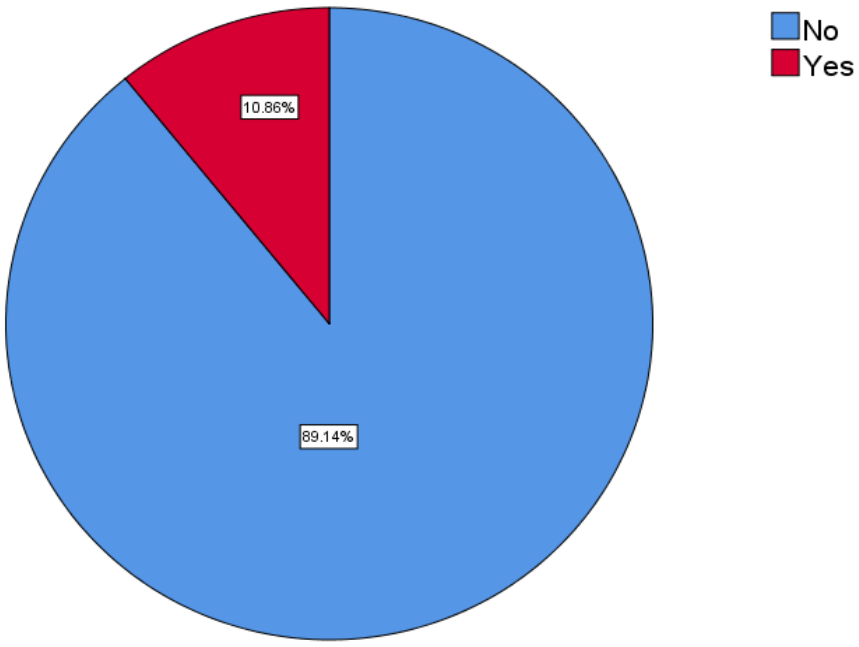

Figure 2. Self-reported PAD awareness, Tikur Anbessa Specialized Hospital,2024 (n=405)

V. Source of information about PAD

The primary source is friends, cited by 52.3% of the total cases. Family members are the second most common source, accounting for 22.7% of cases. TV/Radio and Internet/social media provide information to 18.2% and 11.4% of respondents, respectively. Nurses contribute to 2.3% of the cases, while physicians and other health professionals each account for 4.5% of the total cases. This indicates that friends and family are the most prominent sources of PAD information, with media, online platforms, and healthcare professionals also contributing, though to a lesser extent.

VI. Perceived risks, symptoms, preventive measures, and complications of PAD

Perceived risks of PAD among PAD-aware participants

Table 5. Perceived risk factors of PAD among the study participants at Tikur Anbessa Specialized Hospital, 2024 (n=44)

Perceived risk factors for PAD	Frequency	Percentage of total cases
Old age	2	4.5
Smoking	5	11.4
Diabetes	8	18.2
High blood pressure	5	11.4
High cholesterol	2	4.5
I don't know	27	61.4

The most common response is that 61.4% of respondents did not identify any risk factors for PAD. Diabetes is recognized by 18.2% of respondents as a significant risk factor, followed by smoking and high blood pressure, each noted by 11.4%. Old age and high cholesterol are mentioned by 4.5% of respondents each. This distribution indicates that while some risk factors are acknowledged, a significant portion of individuals are unsure about the risks associated with PAD (*Table 5*).

Males (15%) and older individuals (ages 56-70: 23.1%, >70: 33.3%) are more likely to identify diabetes mellitus as a risk factor, while younger participants (0% in ages 40-55) and those with lower education levels show higher uncertainty (66.7% with no formal education). Urban residents (22%) generally recognize smoking (15%) and high cholesterol (8.3%) as risks more frequently than rural residents (0%).

Overall, a notable proportion of participants are unsure about PAD risks, especially among those with less education (66.7% with no formal education) and in rural areas (100%) (Table *6*).

Table 6. Perceived risks of PAD among PAD-aware participants by sociodemographic characteristics at Tikur Anbessa Specialized Hospital, 2024 (n=44)

	Sex		**Age**		**Education**					**Residence**	
Perceived risk of PAD	M	F	40-55	56-70	>70	No formal education	Primary school	Secondary school	College and above	Urban	Rural
Old age	5	4.2	0	7.7	33.3	33.3	0	0	0	4.9	0
Smoking	15	8.3	7.1	23.1	0	0	0	6.7	22.2	12.2	0
Diabetes Mellitus	20	16.7	14.3	15.4	66.7	0	20	20	22.2	19.5	0
Hypertension	5	16.7	17.9	0	0	0	20	13.3	11.1	12.2	0
High cholesterol	0	8.3	7.1	0	0	0	0	6.7	5.6	4.9	0
I don't know	55	66.7	71.4	53.8	0	66.7	60	73.3	50	58.5	100

Perceived symptoms of PAD among PAD-aware participants

The most frequently identified symptom of PAD is numbness, recognized by 47.7% of respondents. Intermittent claudication (cramping leg pain while walking) is noted by 38.6%, and rest pain is mentioned by 29.5%. Ulcer is identified by 13.6%, while paralysis is cited by 15.9%, and coldness is recognized by 4.5%. Additionally, 34.1% of respondents are unsure of the symptoms. Notably, none of the respondents identified that PAD could be asymptomatic. This distribution shows that numbness and cramping are the most commonly acknowledged symptoms, while a significant portion of individuals are uncertain about the symptoms associated with PAD.

Intermittent claudication is recognized most frequently, noted by 45.8% of women and 30% of men, particularly among those aged 56-70 (46.2%) and over 70 (100%), with less awareness among younger participants and those with no formal education (33.3%). Rest pain is identified by 33.3% of women and 25% of men, with greater recognition among older age groups (66.7% for ages >70).

Ulcers are noted by 8.3% of women and 20% of men, while coldness is recognized by only 4.2% of women and 5% of men. Paralysis is acknowledged by 8.3% of women and 25% of men, with noticeable gaps in recognition among those with no formal education (66.7%) and rural residents (66.7%). There is significant uncertainty about PAD symptoms, with 29.2% of women and 40% of men unsure (Table *7*).

Table 7. Perceived symptoms of PAD among PAD-aware participants by sociodemographic characteristics at Tikur Anbessa Specialized Hospital, 2024 (n=44)

	Sex		**Age**		**Education**					**Residence**	
Perceived symptoms of PAD	M	F	40-55	56-70	>70	No formal	Primary school	Secondary school	College and above	Urban	Rural
Intermittent claudication	30	45.8	28.6	46.2	100	33.3	0	40	50	39	33.3
Rest pain	25	33.3	17.9	46.2	66.7	0	0	20	55.6	31.7	0
Ulcer	20	8.3	7.1	15.4	66.7	0	20	6.7	22.2	14.6	0
Coldness	5	4.2	3.6	7.7	0	0	0	0	11.1	4.9	0
Numbness	45	50	50	38.5	66.7	16.7	40	66.7	44.4	48.8	33.3
Paralysis	25	8.3	14.3	15.4	33.3	16.7	20	20	11.1	17.1	0
I don’t know	40	29.2	35.7	38.5	0	66.7	40	20	33.3	31.7	66.7

Perceived preventive measures of PAD among PAD-aware participants

Dietary changes are noted by 29.2% of women and 10% of men, with higher awareness among those with no formal education (60%) and rural residents (100%). Awareness of dietary control is reported by 12.5% of women and 15% of men, while smoking cessation is mentioned by only 8.3% of women. Lifestyle changes are recognized by 29.2% of women and 30% of men, with higher recognition among those with secondary education (66.7%) (Table *8*).

Table 8. Perceived preventive measures of PAD among PAD-aware participants by sociodemographic characteristics at Tikur Anbessa Specialized Hospital, 2024 (n=44)

	Sex		Age		Education					Residence	
Perceived preventive measures of PAD	M	F	40-55	56-70	>70	No formal	Primary school	Secondary school	College and above	Urban	Rural
Dietary changes	10	29.2	25	15.4	0	60	100	0	16.7	22	0
Dietary control	15	12.5	10.7	15.4	33.3	20	33.3	0	16.7	14.6	0
Smoking cessation	0	8.3	00	15.4	0	0	0	0	11.1	4.9	0
Lifestyle changes	30	29.2	35.7	15.4	33.3	40	66.7	33.3	27.8	31.7	0
Hypertension control	0	8.3	7.1	0	0	20	33.3	0	5.6	4.9	0
Risk-reducing medications	30	29.2	28.6	30.8	33.3	20	33.3	16.7	44.4	29.3	33.3
I don’t know	45	41.7	42.9	53.8	0	40	60	50	27.8	41.5	66.7

Perceived Complications of PAD among PAD-aware participants

Table 9. Perceived complications of PAD among the study participants at Tikur Anbessa Specialized Hospital, 2024 (n=44)

Perceived complications of PAD	**Frequency**	**Percentage of total cases**
Inability to walk	26	59.1
Limb loss/amputation	19	43.2
Death	19	43.2
Heart attack	3	6.8
Stroke	2	4.5
I don't know	7	15.9

The most commonly cited consequence of untreated PAD is the inability to walk, identified by 59.1% of respondents. Limb loss or amputation and death are each recognized by 43.2% of respondents as potential outcomes. Heart attack and stroke are less frequently mentioned, at 6.8% and 4.5%, respectively. Additionally, 15.9% of respondents are unsure about the consequences of untreated PAD (Table *9*).

The inability to walk is identified by 66.7% of women and 50% of men, with a higher recognition among those with secondary education (66.7%). Limb loss is recognized by 33.3% of women and 55% of men, with greater awareness in individuals over 70 (66.7%) and those with secondary education (46.7%). Stroke is noted by only 4.2% of women and 5% of men, while heart attack is recognized by 4.2% of women and 10% of men, with more awareness among those aged over 70 (33.3%). Death is identified by 45.8% of women and 40% of men, with higher recognition in rural areas (66.7%). Additionally, 20.8% of women and 10% of men are unsure about PAD complications (Table *10*).

Table 10. Perceived Complications of PAD among PAD-aware participants by sociodemographic characteristics at Tikur Anbessa Specialized Hospital,2024, (n=44)

	Sex		**Age**		**Education**					**Residence**	
Perceived complications of PAD	M	F	40-55	56-70	>70	No formal	Primary school	Secondary school	College and above	Urban	Rural
Inability to walk	50	66.7	67.9	46.2	33.3	16.7	60	66.7	66.7	63.4	0
Limb loss	55	33.3	35.7	53.8	66.7	0	40	46.7	55.6	43.9	33.3
Stroke	5	4.2	0	7.7	33.3	0	0	0	11.1	4.9	0
Heart attack	10	4.2	3.6	7.7	33.3	0	0	0	16.7	7.3	0
Death	40	45.8	42.9	53.8	0	33.3	60	33.3	50	41.5	66.7
I don’t know	10	20.8	14.3	15.4	33.3	50	20	13.3	5.6	14.6	33.3

VII. Factors associated with self-reported PAD awareness

Four variables were initially selected based on a bivariate analysis with a p-value < 0.25: residence, education level, awareness of stroke, and awareness of abdominal aortic aneurysm (AAA). Among these, two variables—awareness of stroke and awareness of AAA—emerged as statistically significant at $p < 0.05$ in the multivariate logistic regression.

Multivariate analysis found that awareness of stroke and abdominal aortic aneurysm (AAA) are significantly associated with higher levels of self-reported PAD awareness. Specifically, individuals aware of stroke have an adjusted odds ratio (AOR) of 3.6 (95% CI: 1.1-14) and those aware of AAA have an AOR of 3.5 (95% CI: 1.1-11), both with p-values of 0.03, indicating significant associations. (Table *11*).

Table 11. Multivariable logistic regression of factors associated with self-reported PAD awareness at Tikur Anbessa Specialized Hospital, 2024 (n=405)

Characteristics		**COR (95% CI)**	**AOR (95% CI)**	**P-value**
Residence	Urban	3 (0.9-9)	1.3 (0.3-4.8)	0.6
Education level	College and above	2.3 (0.9-6.3)	1.6 (0.7-3.7)	0.26
	Completed secondary school	2.7 (0.9-7.2)	2.0 (0.8-4.9)	0.53
Have you heard about	Stroke	4.5 (1.5-12.9)	3.6 (1.1-14)	**0.03***
	AAA	3.6 (1.1-11)	3.5 (1.1-11)	**0.03***

*Significant at p-value<0.05 during multivariate analysis

CHAPTER SIX: DISCUSSION

Key insights from the study

This study is the first to examine the level of awareness of Peripheral Artery Disease (PAD) in Ethiopia, uncovering significant gaps in understanding this common atherosclerotic condition. The research reveals that the awareness of PAD is notably insufficient, potentially affecting efforts to manage risk factors and prevent cardiovascular events effectively.

In our study, self-reported awareness of Peripheral Arterial Disease (PAD) stands at 10.8%. This rate is lower compared to findings from the United States, Canada, Ireland, Saudi Arabia, and Hong Kong, which aligns with expectations given that Ethiopia is a low- and middle-income country (LMIC) where dedicated vascular treatment is relatively new. The awareness level in our study might also be somewhat overestimated due to its hospital-based setting and the higher representation of urban residents. Nevertheless, it exceeds the 4.5% awareness reported in Sri Lanka. Consistent with most studies (Ireland, Canada, Saudi Arabia, and Sri Lanka), we found that individuals with lower educational attainment, older age, and rural residence exhibit lower levels of PAD awareness.

In Ethiopia, specifically at a tertiary hospital in Addis Ababa, PAD awareness among patients stands at a low 11%. This is in stark contrast to the high awareness levels for other vascular conditions, such as hypertension (99%), heart attacks (97%), and strokes (68%). The primary factors contributing to this low awareness include unfamiliarity with the term PAD and the absence of a clear, widely recognized terminology to describe the condition. Additionally, among those who are aware of PAD, many lack knowledge about its risk factors, clinical symptoms, complications, and preventive measures, as confirmed by earlier studies.

The data highlight a crucial issue: the public often does not recognize PAD as a distinct disease or understand its connection to leg symptoms and severe complications like amputation. Moreover, there is a general lack of awareness that PAD serves as a significant risk marker for major cardiovascular events, including heart attacks and strokes, as well as mortality. Bridging these knowledge gaps is essential to improving both disease management and prevention strategies.

Predictors of PAD awareness

The study identified several factors associated with increased PAD awareness, including awareness of related conditions like stroke and abdominal aortic aneurysm (AAA), having a post-secondary education, and residing in urban areas. These findings align with existing research showing that higher education levels and urban residency are linked to greater disease awareness. For instance, a study in Sri Lanka found higher education to be an independent predictor of PAD awareness. However, contrary to some expectations, age, diabetes, smoking, and high cholesterol did not significantly predict PAD awareness in our multivariate analysis. Previous studies often suggest that older age and risk factors are associated with higher disease awareness, a discrepancy that may stem from differences in public health messaging or study populations. Our results underscore the need for targeted public health campaigns to improve PAD awareness, especially among individuals with lower educational attainment, reflecting a broader trend where lower socioeconomic status is linked to increased cardiovascular risk.

Perceived risk factors for PAD

The majority of respondents, 61.4%, did not identify any risk factors for PAD. Over 80% failed to recognize diabetes as a significant risk factor, and more than 90% did not acknowledge smoking or high blood pressure as risks. Additionally, 95.5% did not identify old age or high cholesterol as risk factors. Similar patterns are observed elsewhere. In Canada, nearly half of those aware of PAD did not recognize diabetes or smoking as risk factors. In Saudi Arabia, less than 45% of those aware of PAD identified various risk factors, including smoking and diabetes. In Sri Lanka, fewer than one-third of those who were aware of PAD recognized hypertension and smoking as risk factors.

Perceived symptoms of PAD

In our study, none of the respondents recognized that PAD could be asymptomatic, a finding that aligns with similar trends observed in other research. For instance, a Saudi study reported that 91% of participants were unaware of the asymptomatic nature of PAD and did not recognize intermittent claudication as a symptom. Similarly, in the U.S., a significant portion of the population lacked awareness about PAD's potential to be asymptomatic, affecting their understanding of the disease’s presentation and associated risk factors.

These findings underscore the urgent need for increased public education on the possibility of asymptomatic PAD. Raising awareness about this aspect is crucial for enhancing early detection and improving the overall management of the disease.

Perceived complications of PAD

Most respondents fail to recognize stroke and heart attack as complications of untreated PAD, with only 6.8% and 4.5% identifying them, respectively. This trend is consistent with other studies, which also overlook stroke and heart attack as recognized complications. This highlights a significant gap in understanding the full range of PAD complications.

Sources of PAD information

Respondents who were PAD aware primarily obtained their information from friends, family, television, radio, and the Internet. Notably, only 11.3% reported receiving information about PAD from healthcare professionals. This figure is similar to the proportion found in studies conducted in the United States and Canada (19%) but is significantly lower compared to the 40% reported in Saudi Arabia. This discrepancy highlights the need for increased involvement of healthcare professionals in educating the public about PAD. However, our study's finding that healthcare professionals play a minimal role in disseminating PAD information contrasts with recommendations from other research advocating for increased involvement of healthcare providers in educating patients about PAD (16).

Overall, our findings underscore the need for targeted public health education to enhance PAD awareness and understanding of its risk factors and complications. As demonstrated by other studies, improving disease awareness through comprehensive public health campaigns and increased involvement of healthcare professionals could help bridge the knowledge gap and facilitate better prevention and management of PAD.

CHAPTER SEVEN: LIMITATIONS AND STRENGTHS OF THE STUDY

The study’s findings are based on self-reported perceptions from patients, which may introduce recall bias and affect the accuracy of knowledge assessments. Additionally, the study's hospital-based setting, with a high representation of urban residents, may not fully reflect the awareness levels of the broader community. The relatively small number of participants who were aware of PAD also posed challenges for statistical analysis within this subgroup, potentially limiting the generalizability of the results.

Despite these limitations, the study has notable strengths. It is the first research of its kind in Ethiopia to specifically focus on public knowledge of PAD, providing valuable insights into current awareness levels. The study achieved a high response rate, which enhances the reliability of the findings. Moreover, the use of interviews and open-ended questions helped reduce information bias, allowing for a more detailed understanding of participants' perceptions and knowledge about PAD.

CHAPTER EIGHT: CONCLUSIONS AND RECOMMENDATIONS

This survey reveals substantial gaps in awareness regarding PAD in Ethiopia. The study underscores a significant lack of understanding among the population about PAD's symptoms, risk factors, and serious consequences, such as heart attacks, strokes, and amputations. The data indicates that awareness is particularly low among high-risk groups, including older adults and those with lower levels of education. These gaps in knowledge are concerning, given the severe health implications associated with PAD.

The findings highlight an urgent need for targeted public health campaigns designed to increase PAD awareness. Such campaigns should focus on simplifying medical terminology to improve public understanding of the disease. The implementation of these initiatives is crucial for addressing the current knowledge deficiencies and facilitating better disease management and prevention. Previous community education efforts in other regions have demonstrated success in improving awareness, suggesting that similar strategies could be effective in Ethiopia.

Integrating PAD awareness into Ethiopia’s broader non-communicable disease prevention programs is essential. This integration would help bridge the existing knowledge gap and promote early diagnosis and treatment of PAD. Enhanced public awareness could lead to more timely interventions, potentially reducing the incidence of severe cardiovascular complications related to PAD.

Furthermore, additional research is necessary to assess the impact of public health education on clinical outcomes. Expanding studies to include a broader population will help validate the current findings and address potential biases. By understanding the effectiveness of various educational strategies and their influence on PAD awareness and management, stakeholders can develop more effective interventions and policies.

Overall, addressing these awareness gaps through comprehensive public health initiatives and further research is critical for improving PAD management and reducing the associated health burden in Ethiopia.

CHAPTER NINE: REFERENCES

1. Hiatt WR, Goldstone J, Smith SC, McDermott M, Moneta G, Oka R, et al. Atherosclerotic peripheral vascular disease symposium II: Nomenclature for vascular diseases. In: Circulation. 2008. p. 2826–9.
2. Olin JW, Sealove BA. Peripheral artery disease: Current insight into the disease and its diagnosis and management. In: Mayo Clinic Proceedings. Elsevier Ltd; 2010. p. 678–92.
3. Hirsch AT, Murphy TP, Lovell MB, Twillman G, Treat-Jacobson D, Harwood EM, et al. Gaps in public knowledge of peripheral arterial disease: The first national PAD public awareness survey. Circulation. 2007 Oct;116(18):2086–94.
4. Salameh MJ, Federman DG. Peripheral Arterial Disease: Increasing Awareness-A Major Step Forward. 2009.
5. Willigendael EM, Teijink JAW, Bartelink ML, Boiten J, Moll FL, Büller HR, et al. Peripheral arterial disease: Public and patient awareness in the Netherlands. European Journal of Vascular and Endovascular Surgery. 2004;27(6):622–8.
6. Johnston LE, Stewart BT, Yangni-Angate H, Veller M, Upchurch GR, Gyedu A, et al. Peripheral Arterial Disease in Sub-Saharan Africa. JAMA Surg. 2016 Jun 1;151(6):564.
7. Hagos A, Fekadu S, Allison T, Wondafrash M, workicho A, Mulatu HA. The Prevalence of Peripheral Arterial Disease and Associated Factors among Adults in Jimma Town, South-West Ethiopia: A Community Based Survey. J Clin Exp Cardiolog. 2017;08(07).
8. Akalu Y, Birhan A. Peripheral Arterial Disease and Its Associated Factors among Type 2 Diabetes Mellitus Patients at Debre Tabor General Hospital, Northwest Ethiopia. J Diabetes Res. 2020 Jan 29;2020:1–9.
9. Seyoum N, G/Giorgis D, Nega B. Pattern of Vascular Diseases at Tikur Anbessa Specialized Hospital, Addis Ababa, Ethiopia. Ethiop J Health Sci. 2019 May;29(3):377–82.
10. Cronin CT, McCartan DP, McMonagle M, Cross KS, Dowdall JF. Peripheral Artery Disease: A Marked Lack of Awareness in Ireland. European Journal of Vascular and Endovascular Surgery. 2015 May;49(5):556–62.
11. Weragoda J, Weerasinghe MC, Seneviratne R, Wijeyaratne SM. Gaps in awareness of peripheral arterial disease in Sri Lanka: a cross sectional study. BMC Public Health. 2016 Oct 12;16(1):1–6.
12. Keelan S, Foley N, Healy D, Kheirelseid E, McHugh S, Moneley D, et al. Poor patient awareness

of peripheral arterial disease, it is time to optimize the clinical visit. Surgeon. 2022 Jun 1;20(3):157–63.

13. Lovell M, Harris K, Forbes T, Twillman G, Abramson B, Criqui MH, et al. Peripheral arterial disease: Lack of awareness in Canada. Vol. 25, Can J Cardiol. 2009.
14. Chan T, Lam C, Lai A, Yan B. PCR108 Large Gaps in Public Awareness of Peripheral Arterial Disease in Hong Kong: A Cross Sectional Study. Value in Health. 2022 Jul;25(7):S561.
15. Lovell M, Harris K, Forbes T, Twillman G, Abramson B, Criqui MH, et al. Peripheral arterial disease: Lack of awareness in Canada. Canadian Journal of Cardiology. 2009;25(1):39–45.
16. Ayeed S Bin, Hussain MA, AlHamzah M, Al-Omran M. Poor knowledge of peripheral arterial disease among the Saudi population: A cross-sectional study. Vascular. 2017 Feb 1;25(1):86–91.
17. Hirsch AT, Gloviczki P, Drooz A, Lovell M, Creager MA. Mandate for Creation of a National Peripheral Arterial Disease Public Awareness Program: An Opportunity to Improve Cardiovascular Health [Internet]. 2004. Available from: www.mosby.com/jvs
18. Hirsch AT, Criqui MH, Treat-Jacobson D, Regensteiner JG, Creager MA, Olin JW, et al. Peripheral Arterial Disease Detection, Awareness, and Treatment in Primary Care [Internet]. Available from: http://jama.jamanetwork.com/
19. Keelan S, Foley NM, Healy D, Moneley D, McHugh S, Kheireseid R, et al. Is It Time for a National Awareness Campaign for Peripheral Arterial Disease (PAD)? European Journal of Vascular and Endovascular Surgery. 2020 Aug;60(2):e56.
20. Perneger T V., Courvoisier DS, Hudelson PM, Gayet-Ageron A. Sample size for pre-tests of questionnaires. Quality of Life Research. 2015 Jan 10;24(1):147–51.

ANNEXES

Annex 1. Questionnaire

Survey Introduction:

Title: Awareness of Peripheral Artery Disease (PAD) and Associated Factors among Tikur Anbessa Hospital Patients

Dear Participant

I am Dr. Yonas Nibret, a fellow in vascular and endovascular surgery at Addis Ababa University's Department of Surgery. As part of ongoing research, I am conducting a study to understand your level of awareness about peripheral artery disease. The aim is to identify awareness gaps and help develop targeted public education campaigns.

To gather valuable insights, we have prepared a questionnaire that will take a maximum of 10 minutes of your time. Your participation in this study is entirely voluntary. Your decision to take part or not will not impact the services you receive at the hospital. You have the right to stop the interview at any time or choose not to answer specific questions.

Rest assured that your responses will be treated with the utmost confidentiality. Your name will not be disclosed in the survey, and your answers will remain unlinked to your identity. There are no right or wrong answers; we are simply interested in your honest responses to the questions and statements.

Your cooperation is vital for the success of this study. Could you please indicate your willingness to participate by selecting the appropriate option below?

☐ Yes, I am willing to participate. ☐ No, I am not willing to participate.

Thank you for your time and consideration. If you choose to participate, your input will contribute significantly to advancing our understanding of PAD awareness.

Part I: Sociodemographic characteristics

1. Sex ☐ Male ☐ Female
2. Age _____
3. Education level ☐No formal school ☐ Completed primary school ☐ Completed secondary school ☐College and above
4. Residence ☐ Urban ☐ Rural

Part II: Clinical profile

5. Do you smoke a cigarette? ☐Yes, active smoker ☐ Ex-smoker ☐Never smoked
6. Are you currently on treatment for any of the following? ☐ High blood pressure ☐ High cholesterol ☐Diabetes
7. Have you ever had ☐A stent on heart ☐Stroke ☐ Heart attack

Part III: Awareness Assessment

8. Have you heard or read about the following diseases? ☐Diabetes ☐Hypertension ☐Stroke ☐Heart attack ☐Abdominal aortic aneurysm ☐Breast cancer
9. Have you ever heard or read anything about peripheral artery disease (PAD)? ☐Yes ☐ No
10. Do you know anyone with PAD? ☐ Yes ☐No
11. Who do you know with PAD? ☐ Myself ☐Family member ☐Friend ☐ Someone else
12. What do you think when you hear the term PAD? ☐A very innocent condition ☐Relatively innocent condition ☐Relatively serious condition ☐ Very serious condition ☐ I don't know
13. What do you think are the symptoms of PAD? ☐I don't know ☐ No symptoms ☐ intermittent claudication(cramping leg pain while walking) ☐Rest pain ☐Ulcer ☐Coldness ☐ Numbness ☐Paralysis
14. What do you think increases the risk of getting PAD? ☐Old age ☐Smoking ☐ Diabetes ☐High blood pressure ☐High cholesterol

15. What are the preventive measures of PAD? ☐I don't know ☐Dietary changes ☐Diabetes control ☐Smoking cessation ☐ Lifestyle change ☐Hypertension control ☐Risk reducing medications
16. What do think PAD can lead to if left untreated? ☐Inability to walk ☐Limb loss/amputation ☐Stroke ☐Heart attack ☐Death
17. What is your source of information on PAD? ☐Physician ☐Nurse ☐Other health professional ☐Family members ☐Friends ☐TV/Radio ☐ Internet/social media ☐ Not sure

Annex 2. መጠይቅ፡ የአማርኛ ቅጅ

የዳሰሳ ጥናት መግቢያ

ርዕስ፤ የጥቁር አንበሳ ሆስፒታል ህሙማን ስለ የ እግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ እና ተያያዥ ምክንያቶች ያላቸዉ ግንዛቤ

እኔ ዶ/ር ዮናስ ንብረት ፤ በአዲስ አበባ ዩኒቨርስቲ የቀዶ ህክምና ትምህርት ክፍል የ ደም ቧንቧ ቀዶ ህክምና ሃኪም ነኝ ። እንደ ቀጣይ ምርምር አካል ስለ ደም ወሳጅ ቧንቧዎች ያለወትን የግንዛቤ ደረጃ ለመረዳት ጥናት እያካሄድኩ ነው። ዐላማዉም የግንዛቤክፍተትን መሰረት ያደረገ የማህበረሰብ ትምህርት ዘመቻ ዝግጅትን መርዳት ነው።

የግንዛቤ መረጃዎችን ለመሰብሰብ፤ ጊዜውን ቢያንስ 10 ደቂቃ የሚውስድ መጥይቅ አዘጋጅተናል። በዚህ ጥናት ላይ ያለዎት ተሳትፎ ሙሉ በሙሉ በፈቃደኝነት ላይ የተመሰረተ ነው። የመሳተፍ ወይም ያለመሳተፍ ዉሳኔዎ በሆስፒታል ዉስጥ በሚያገኙት አገልግሎት ላይ ተጽዕኖ አይኖረዉም።

በማንኛዉም ጊዜ ቃለመጠይቁን የማቆም ወይም የተወሰኑ ጥያቄወችን ላለመመለስ የመምረጥ መብት አለዎት ። የእርስዎ ምላሾች በከፍተኛ ሚስጥራዊነት እንደሚስተናገዱ እርግጠኛ ይሁኑ። በ ዳሰሳ ጥናቱ ዉስጥ ስምዎ አይገለጽም፤ እና መልሶችዎ ከማንነትዎ ጋር ያልተገናኙ እንደሁኑ የቆያሉ።

ትክክለኛ ወይም የተሳሳቱ መልሶች የሉም፤ ስለሆነም ለጥያቄዎች እና መግለጫወች ሀቀኛ መልሶች ከእርስዎ እንጠብቃለን ።

እባክዎን ከዚህ በታች ተገቢዉን አማራጭ በመምረጥ ለመሳተፍ ፈቃደኛ መሆንዎን ማመላከት ይችላሉ?

☐ አዎ ፣ ለመሳተፍ ፈቃደኛ ነኝ ☐አይ፣ ለመሳተፍ ፈቃደኛ አይደለሁም

ለጊዜዎ እና አስተያየትዎ እናመሰግናለን። ለመሳተፍ ከመረጡ፣ የእርስዎ ግብዐት ህሙማን ስለ የ እግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ ያላቸዉ ግንዛቤ ያለንን መረዳት ለማሳደግ ከፍተኛ አስተዋጽኦ ይኖረዋል።

ክፍል አንድ ፤ አጠቃላይ መረጃ

1. ጾታ ☐ወንድ ☐ ሴት
2. እድሜ ☐
3. የትምህርት ደረጃ፤ ☐መደበኛ ትምህርት ያልተማረ ☐የመጀመሪያ ደረጃ ትምህርት ያጠናቀቀ ☐ሁለተኛ ደረጃ ትምህርት ያጠናቀቀ ☐ኮሌጅ እና ከዛ በላይ

4. መኖሪያ ቦታ ፤ ☐ከተማ ☐ ገጠር

ክፍል ሁለት ፤ የህክምና ታሪክ

5. ሲጋራ ያጨሳሉ? ☐አዎ አሁንም አጨሳለሁ ☐በፊት አጨስ ነበር ☐ አጭሸ አላዉቅም
6. በአሁኑ ሰዐት ለሚከተሉት በሽታወች ህክምና ላይ ነዎት? ☐ ከፍተኛ የደም ግፊት ☐ከፍተኛ ኮሌስትሮል ☐የስኪር በሽታ
7. ከአሁን በፊት የሚከተሉት ሁኔታዎች አጋጥሞዎት ያዉቃሉ? ☐ስትሮክ ☐የልብ ድካም ☐ በልብ ላይ ቱቦ ገብቶልዎት ያዉቃል?

ክፍል ሶስት፤ የግንዛቤ ጥያቄዎች

8. ስለሚከተሉት በሽታዎች ሰምተው ወይም አንብበው ያዉቃሉ? ☐ ከፍተኛ የደም ግፊት ☐ ከፍተኛ ኮሌስትሮል ☐የስኪር በሽታ ☐ስትሮክ ☐የልብ ድካም ☐የሆድ ደም ዎሳጅ ቧንቧ መለጠጥ ☐የጡት ካንሰር
9. ስለ የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ ሰምተዉ ወይም አንብበዉ ያውቃሉ? ☐ አዎ፣ አዉቃለሁ ☐ አይ፣ አላዉቅም
10. የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ ያለበት ሰው ያውቃሉ? ☐አዎ፣ አዉቃለሁ ☐ አይ፣ አላዉቅም
11. የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ ያለበት ማንን ያውቃሉ? ☐ ራሴን ☐ የቤተሰብ አባል ☐ ጓደኛ ☐ሌላ ሰው
12. የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ ሲባል ምን ያስባሉ? ☐በጣም ቀላል ሁኔታ ☐በአንጻራዊነት ቀላል ሁኔታ ☐ በአንጻራዊነት ከባድ ሁኔታ ☐በጣም ከባድ ሁኔታ
13. የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ ምልክቶች ምንድን ናቸው ብለው ያስባሉ? ☐ አላዉቅም ☐ ምንም ምልክቶች ላይኖሩ ይችላል ☐በጉዞ ወቅት የሚሰማ የእግር ህመም ☐ ምንም ሳይሰሩ የሚሰማ የእግር ህመም ☐ቁስል ☐ቅዝቃዜ ☐መደንዘዝ
14. የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታን የመያዝ ዕድል ምን ይጨምራል ብለው ያስባሉ? ☐እርጅና ☐ሲጋራ ማጨስ ☐ የስኪር በሽታ ☐ ከፍተኛ የደም ግፊት ☐ከፍተኛ ኮሌስትሮል

15. የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ መከላከያ መንገዶች ምንድን ናቸው ብለው ያስባሉ? ☐አላዉቅም ☐የአመጋገብ ለዉጥ ☐የስኪር በሽታን መቆጣጠር ☐ማጨስ ማቆም ☐የአኗኗር ዘይቤ መቀየር ☐የደም ግፊት በሽታን መቆጣጠር ☐በሽታ የመያዝ ዕድልን የሚቀንሱ መድሃኒቶች መጠቀም
16. የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ ካልታከመ ወደ ምን ሊያመራ ይችላል ብለው ያስባሉ? ☐መራመድ አለመቻል ☐ የእግር መቆረጥ ☐ስትሮክ ☐የልብ ድካም ☐ሞት
17. ስለ የእግር ደም ወሳጅ ቧንቧ መጥበብ/መዘጋት በሽታ የእርስዎ መረጃ ምንጭ ምንድን ነው? ☐ ሃኪም ☐ነርስ ☐ሌላ የጤና ባለሙያ ☐ የቤተሰብ አባላት ☐ጓደኞች ☐ቴሌቪዥን/ ራዲዮ ☐ኢንተርኔት/ ማህበራዊ ሚዲያ ☐እርግጠኛ አይደለሁም