ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCE

SCHOOL OF MEDICINE

DEPARTMENT OF EMERGENCY MEDICINE

RESEARCH THESIS ON

CLINICAL PROFILE OF PERIPHERAL ARTERIAL DISEASE AT EMERGENCY DEPARTMENT IN TIKUR AMBESA SPECIALIZED HOSPITAL, ADDIS ABEBA, ETHIOPIA.

BY

SHEWIT TESFAGABR (MD,)

A RESEARCH THESIS TO BE SUBMITTED TO COLLEGE OF HEALTH SCIENCE, ADDIS ABABA UNIVERSITY FOR PARTIAL FULFILLMENT OF SPECIALITY CERTIFICATE TRAINING ON EMERGENCY MEDICINE AND CRITICAL CARE.

JUNE, 2018

ADDIS ABABA, ETHIOPIA

CLINICAL PROFILE OF PERIPHERAL ARTERIAL DISEASE AT EMERGENCY DEPARTMENT IN TIKUR AMBESA SPECIALIZED HOSPITAL, ADDIS ABEBA, ETHIOPIA.

BY

SHEWIT TESFAGABR (MD,)

ADVISORS:

1. **SOFIA KEBEDE M.D.EMERGENCY MEDICINE AND CRITICAL CARE, SCHOOL OF MEDICINE, ADDIS ABABA UNIVERSITY.**

2. **BRUK GIRMA, M.D.EMERGENCY MEDICINE AND CRITICAL CARE, SCHOOL OF MEDICINE, ADDIS ABABA UNIVERSITY.**

.

JUNE, 2018

ADDIS ABABA, ETHIOPIA

Declaration

I, the undersigned, declare that this is my original work and that all sources of materials used for this thesis are duly acknowledged.

Name: Dr.ShewitTesfagabr

Email: libean2016@gmail.com

Signature: _____

Date of submission: _____

Place: Addis Ababa, Ethiopia

This thesis has been submitted for examination with my approval as University advisor

Name of advisors: Dr Sofia Kebede

Signature: _____

Date:_____

Name of advisors: Dr BrukGirma

Signature: _____

Date:_____

ACKNOWLEDGMENT

First of all, I would like to say thank for the Almighty God for giving me insight in my life. Next I would like to express my deepest gratitude and appreciation to my advisors Dr. Sofia Kebebe and DrBrukGirma for their encouragement and provision of constructive comments and guidance starting from topic selection up to report this thesis.

Finally, I would like to acknowledge Addis Ababa University, college of health sciences department of Emergency Medicine and Critical Care for giving me this golden and educative opportunity.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS AND ACCRONOMYS

A.A: Addis Ababa

AAU: Addis Ababa University

CVDs: Cardiovascular diseases

NCDs: Non-communicable diseases

HICs: High income countries

LMICs: Low and Middle income countries

PAD: Peripheral arterial disease

IC: Intermittent claudication

CLI: Critical limb ischemia

ALI: Acute limb ischemia

LEA; Lower extremity amputation

ABI: Ankle-brachial index

DALY: Disability Adjusted Life Year

LOS: length of stay

TASH-ED: Tikur ambesaspecialized hospital-Emergency Department

WHO: World Health Organization

ABSTRACT

Background:Peripheral Arterial Disease is defined as ankle-brachial index $\leq$ 0.90 and it is a progressive occlusion of arteries supplying the peripheral vasculature.Globally, 202 million people were living with peripheral artery disease in 2010. Recent reports suggest that the burden of PAD has increased globally over the last decade. A meta-analysis of global PAD prevalence in low and middle income countries (LMICs) and high income countries (HICs) estimated that 14.2million people had PAD in sub-Saharan Africa in 2010.

Objective:to assess the clinical Profile of Peripheral Arterial Disease at Emergency Department in Tikur Anbesa Specialized Hospital, Addis Ababa, Ethiopia**.**

Methodology: This study was a retrospective record based quantitative study conducted from September 2016 to May 2018diagnosed at emergency department of Tikur Anbesa Specialized Hospital. Data was entered and analyzedusing SPSS version 21 descriptive statistics was carried out to explore the socio-demographic characteristics of the patient, prevalence of peripheral arterial disease, clinical profile and the outcome of the disease and the results was summarized as frequencies and percentages. $P < 0.05$ considered to be statically significant.

Result: From total of 105 recorded data 73 were males and 32 were females. The male to female ratio was 2.3:1 and age range was 13-100, with a mean age of 56.5 years. Prevalence ofPeripheral Arterial Disease in males and females were 69.5%, 30.5% respectively and the highest prevalence was at the age range of 57-67 years 24(22.9%).

Conclusion and recommendation: Prevalence ofPeripheral Arterial Disease in males was twice than in females in this study. The prevalence of "traditional" cardiovascular disease risk factors such as hypertension, diabetes, and alcohol was high among individuals with Peripheral Arterial Disease. Most subjects had prolonged length of study in the emergency department.

1. INTRODUCTION

1.1 Background

Peripheral arterial disease is a term used to describe the impairment of blood flow to the extremities usually as a result of atherosclerotic occlusive disease.[2] Generally speaking, the presence of symptoms in PAD depends on the metabolic demands of the ischemic tissue during exercise, the degree of collateral circulation and the size and location of the affected artery.[1]

The incidence of PAD varies in the general population from 3% to 10% in people younger than 70 years to 15–20% in people older than 70 years.[3]However, 40% of PAD patients are asymptomatic, while only 10% of them present with typical intermittent claudication (IC).[3, 4] One third of PAD patients will have a complete occlusion of a major artery to the leg at first presentation.[5, 6]

Peripheral arterial disease is an important circulatory system disorder similar in prevalence to stroke and coronary heart disease.[2] Peripheral arterial disease (PAD) causes significant morbidity and is an important risk factor for cardiovascular disease–related mortality. The ankle-brachial index < 0.90 is considered equivalent to peripheral arterial disease.[7]

Although 65–75% of patients with PAD are asymptomatic, the classic presenting symptom is IC which is usually described as muscle cramps, fatigue or pain in the lower legs induced by exercise and rapidly relieved by rest; often the symptom location indicates the level of arterial involvement.[5]Less commonly, patients may present with critical limb ischemia. The European Society of Vascular Surgeons defined CLI as a recurring ischemic rest pain requiring analgesia for weeks or ulceration or gangrene of foot or toes with ankle systolic pressure ,50 mmHg or toe systolic pressure ,30 mmHg (Fontaine's III and IV).[3]

Fontaine's classification, proposed in 1954, remains a popular way of staging PAD. It divides patients into groups according to their clinical presentation. A similar clinical classification developed more recently by Rutherford has the advantage of including hemodynamic data, helping to ensure that any rest pain or tissue loss is directly related to PAD (**Table 1**).[7] Rest pain

is an alarming sign of CLI and often presents at night when the blood supply to the foot is affected by both gravity and the increased metabolic requirement caused by warmth.[1]

Table 1 *Fontaine's and Rutherford's classification of peripheral arterial disease*

Fontaine's		**Rutherford's**	
Stage	**Clinical presentation**	Stage	Clinical presentation
I	**Asymptomatic**	0	Asymptomatic
II	**Intermittent claudication**	1	Mild claudicate
IIa	**on walking > 200 m**	2	Moderate claudication
IIb	**on walking < 200 m**	3	Severe claudication
III	**Rest pain**	4	Rest pain
IV	**Ulceration or gangrene**	5	Minor ischaemic ulceration
		6	Severe ischemic ulcers or frank gangrene

The risk factors found in high-income countries are also related to PAD in LMICs, although the strengths of the associations are slightly lower in cross-sectional studies. . In LMICs, the rapid consequences of industrialization, urbanization and poverty might affect the risk of acquiring PAD. Long-term air pollution exposure has been shown to have an effect on the development of atherosclerotic diseases, including PAD.[8]

Around 20–40 million are likely to have intermittent claudication and 100 million atypical leg symptoms. Pain and limited mobility lead to a diminished quality of life. However, even asymptomatic people with peripheral artery disease have impaired lower extremity functioning, increased mobility loss, and faster functional decline than individuals without peripheral artery disease.[9]

The approximate 1 year outcome for all patients presenting with CLI is that 30% will have had an amputation, and only 45% will be alive with both legs intact. Patients with PAD often have concomitant coronary and cerebral artery disease. In the REACH registry involving 44 countries worldwide, 39% of patients with PAD also had coronary artery disease, 10% also had cerebral

artery disease, and 13% had both conditions in addition to PAD; <40% of patients with PAD did not have concomitant coronary or cerebral artery disease.[10]

PAD as initial manifestation of atherosclerotic disease diagnosed in a hospital-based setting conferred a high risk: one in eight patients experienced a major CV event and one in six patients died within 1 year.[11]A recent Danish nationwide study demonstrated a greater longterm risk of both total and CV-related death for patientswith incident PAD than for those with incident myocardial infarction (MI), for both women and men.[12]

A prospective study (2015) on patterns and predictors of early mortality among emergency department patients in Addis Ababa, Ethiopia demonstrate the overall early ED mortality rate among patients alive on arrival to the ED was 1.9 %. The average age of death was 43.1 years, with a male: female ratio of 1.4:1.[13]

In Ethiopia studies on the clinical profile of peripheral arterial disease at the emergency center is so far not done. Its risk stratification and effect on the quality of life is not well known. Thus this study aimed to map both clinical and epidemiological profile of peripheral arterial disease patients at tertiary level hospital in Tikur Ambesa specialized hospital ED.

1.2 Statement of the problem

In the 21st century, peripheral artery disease has become a global problem. Globally, 202 million people were living with peripheral artery disease in 2010, 69.7% of them in low or middle income countries (LMIC), including 54.8 million in south East Asia and 45.9 million in the western Pacific Region. During the preceding decade the number of individuals with peripheral artery disease increased by 28.7% in LMIC and 13.1% in HIC (high income countries).[14]Recent reports suggest that the burden of PAD has increased globally over the last decade.[5]

There is evidence that the burden of PAD is rising more rapidly than other forms of CVD in sub-Saharan Africa. A meta-analysis of global PAD prevalence in low and middle income countries (LMICs) and high income countries (HICs) estimated that 14.2million people had PAD in sub-Saharan Africa in 2010.[14]

The epidemiological transition from predominately infectious to non-communicable diseases in sub-Saharan Africa has made cardiovascular disease (CVD) a public health priority. Cardiovascular disease will be the leading cause of death in low-and middle-income countries (LMICs), including those in sub- Saharan Africa, as early as 2030.[14]

Although major amputation is a relatively rare outcome of claudication, with only 1–3% of claudicates needing it over a 5-year period, limbs with ulceration due to arterial insufficiency treated without revascularization will have a 19% risk of amputation at 6 months and 23% risk at 1 year. Cardiovascular risk varies with the severity of PAD and is closely correlated with both reduced and increased ankle brachial pressure index. The relationship between ABI and mortality over a period of 10 years in the Strong Heart Study is claudicate at 5, 10 and 15 years is 30, 50 and 70%, respectively, and similar rates are found in asymptomatic patients. Twenty-five per cent of CLI patients will die within a year of diagnosis.[1]

In the 21st century, peripheral artery disease has become a global problem. Governments, nongovernmental organizations, and the private sector in LMIC need to address the social and economic consequences, and assess the best strategies for optimum treatment and prevention of this disease.[14]

In Ethiopia studies on the clinical profile of peripheral arterial disease at the emergency center is so far not done. Its risk stratification and effect on the quality of life is not well known. Thus this study aimed to map both clinical and epidemiological profile of peripheral arterial disease patients at tertiary level hospital in Tikur Anbesa specialized hospital ED.

1.3 Rationale for the study

Even though the prevalence of CVDs and stroke is increasing in Ethiopia; the clinical and epidemiological profile of PAD is not yet studied. So the risk factors of PAD are not well known. To identify the risk factors of PAD means to reduce CVDs events; because PAD increases the rate of CVDs related morbidity and mortality.

The World Health Organization has set a target to reduce deaths caused by non - communicable disease in people younger than 70 years by 25% by 2025 through investing in cost-effective "best buy" interventions. In addition to mitigating the future CVD burden in LMICs, the cost benefits are estimated to be more than US $375 billion by 2025.[15]So the findings of this study will help to reach the WHO Health Organization target and to reduce the expenses in Ethiopia.

1.4 Significance of the study

Despite PAD's being diagnosed in a hospital setting and patients' being at high risk of CV events; many patients with PAD did not receive secondary preventive drug therapy. So the findings of this study will suggest that risk prevention will be the key strategy in the management of patients with PAD: positive lifestyle changes will be encouraged, and patients with PAD should be prescribed secondary preventive drug therapy with antiplatelet therapy and statins at hospital discharge. Ideally, to reduce long-term CV and limb events, PAD patients should be offered participation.

The findings of this study also will help as a source for the development of action plan and guidelines for the management and prevention of PAD in Ethiopia. It will use as a base line data reference for researchers.

2. LITERATURE REVIEW

2.1 Global distributions

Chronic non-communicable diseases (NCDs) are now the leading cause of morbidity and mortality not only in high-income countries (HIC), but also in low-income or middle-income countries (LMIC). Over the next decade, the global burden of NCDs will grow rapidly, driven mainly by an ageing world population and increased exposure to chronic disease risk factors in LMIC.

The global pandemic of NCDs was the main topic of a UN high-level meeting in 2011. One of the first tasks required for a coordinated and cost-effective response is to quantify the current burden of the most important NCDs and their global and regional spread. One of the best examples is lower limb peripheral artery disease, the third leading cause of atherosclerotic vascular morbidity after coronary heart disease and stroke.[9]

The epidemiological transition from predominately infectious to non-communicable diseases in sub-Saharan Africa has made cardiovascular disease (CVD) a public health priority. Cardiovascular disease will be the leading cause of death in low-and middle-income countries (LMICs), including those in sub- Saharan Africa, as early as 2030.[14]

In the 21st century, peripheral artery disease has become a global problem. Globally, 202 million people were living with peripheral artery disease in 2010, 69.7% of them in low or middle income countries (LMIC), including 54.8 million in south East Asia and 45.9 million in the western Pacific Region. During the preceding decade the number of individuals with peripheral artery disease increased by 28.7% in LMIC and 13.1% in HIC (high income countries).Recent reports suggest that the burden of PAD has increased globally over the last decade.[14, 16]

The prevalence of PAD is estimated to be 10%–25% in people aged ≥55 years and increases to approximately 40% in community populations aged >80 years. Approximately 4–8 million people are affected by PAD in the United States of America. In Germany around 1.8 million people have symptomatic PAD and each year between 50,000 to 80,000 patients develop CLI. In a population-based study in Western Australia, the prevalence of PAD was reported to be approximately 23% in men aged 75–79 years.[16]

The majority (>70%) of all PAD encounters occurred in the outpatient setting. The weighted mean age-standardized prevalence and incidence of outpatient PAD was 11.8% (95% CI 11.5–12.1) and 22.4 per 1000 person-years (95% CI 20.8–24.0), respectively. Black patients had higher weighted mean age-standardized prevalence (15.6%; 95% CI 14.6–16.4) compared with white patients (11.4%; 95% CI 11.1–11.7). Black women had the highest weighted mean age-standardized prevalence (16.9%; 95% CI 16.0–17.8). Black patients also had a higher incidence rate of PAD (31.3 per 1000 person-years; 95% CI 27.3–35.4) compared with white patients (25.4 per 1000 person-years; 95% CI 23.5–27.3). PAD prevalence and incidence did not differ by sex alone.[2]

The prevalence of PAD differs by ethnicity, and the prevalence in Asians has been reported to be lower than in other ethnic groups. The overall prevalence of PAD in Japan has been estimated to range from 1.7% to 2.7% in the population 40 years, 0.4% to 1.0% in the younger population 40 and 60 years, and from 3.4% to 4.3% in the older population > 60 years, which is lower than in other countries.[17]

In Sweden nationwide cohort study in 2017 including patients diagnosed with PAD in a hospital setting, more than one in five will die within 1 year and one in six will experience a major CV event within 1 year. Patients with symptomatic PAD as the initial manifestation of

atherosclerotic disease are at high risk: one in six patients will die within 1 year and one in eight will experience a major CV event within 1 year. A history of ischemic stroke markedly increased the risk.[11]

In the 21st century, peripheral artery disease has become a global problem. Governments, nongovernmental organizations, and the private sector in LMIC need to address the social and economic consequences, and assess the best strategies for optimum treatment and prevention of this disease.[14]

2.2 Regional distribution

Global populations are undergoing a major epidemiological transition in which the burden of atherosclerotic cardiovascular diseases is shifting rapidly from high-income to low-income and middle-income countries (LMICs). Peripheral artery disease (PAD) is no exception, so that greater focus is now required on the prevention and management of this disease in less-advantaged countries.[8]

The prevalence of PAD in sub-Saharan Africa appears to follow the pattern of CVD risk factor exposure. In those areas still primarily affected by infectious disease and minimal exposure to traditional CVD risk factors, prevalence may be low; however, in areas with progressive urbanization, longer life expectancy, and more exposure to CVD risk factors, prevalence is equal to or higher than that seen in HICs. In high-risk populations, prevalence has been reported to exceed 50%.[14]

Reports documented a high PAD prevalence, ranging from 3.1% to 24% of older adults from community based surveys and 39% to 52% of those with known risk factors (eg, diabetes).[1] In one study in Angola, we found prevalence of PAD to be 42.6%, which is more in accordance with Africans studies made in populations with specific risk factors such as diabetes in Uganda (39%) and Nigeria (40%) and hypertension in Nigeria (41.8%). However, it is relatively greater than that found in general population studies as that done in Brazzaville (32.4%).[18, 19, 20]

Together, these findings suggest a significant burden of PAD in sub-Saharan Africa, most of which remains undiagnosed and untreated owing to insufficient awareness and capacity. The international Reduction of Atherothrombosis for Continued Health Registry, which enrolled patients older than 45 years worldwide, reported an overall PAD prevalence of 15%, with

estimates ranging from 6% in Asia to 24% in Western Europe. In a group of high-risk patients in France, investigators reported PAD prevalence to be 28% (95% CI, 27%-29%). The findings from community-based surveys in sub- Saharan Africa are similar or higher than the Reduction of Atherothrombosis for Continued Health Registry estimates. However, the prevalence among known risk groups was significantly higher. This could be related, in part, to poor primary and secondary prevention, evidenced by the lack of appropriate medical management and paucity of surgical reports retrieved.[14]

The higher overall prevalence reported in high-risk sub-Saharan Africa patients relative to high-risk groups elsewhere is likely multifactorial in origin, but may also be related to the racial and ethnic differences observed in HICs[2]. Therefore the prevalence of PAD was highly variable with as few as 3% or as many as 52%of individuals in sub-Saharan Africa having PAD, depending on the geographic region and risk factors of the individuals.[9]

A 2013 meta-analysis also highlighted the differential effect of traditional cardiovascular risk factors on PAD prevalence in HICs vs LMICs, noting that the traditional risk factors were stronger predictors of risk in HICs than in LMICs. This raises the possibility that there may be other undetermined risk or epigenetic factors that may play a role in the observed discrepancy in PAD prevalence between regions associated vasculopathy.[14]

Research to date suggests that PAD might affect a greater proportion of women than men in LMICs. Although factors such as poverty, industrialization, and infection might conceivably influence the development of PAD in such settings, the ageing of the population and increase in traditional cardiovascular risk factors, such as smoking, diabetes mellitus, and hypertension, are likely to be the main driving forces.[8]

The findings from the retrieved reports also suggest that age is a predominant risk factor for PAD in sub-Saharan Africa. Extrapolating to risk at the city or country level, those locations within sub-Saharan Africa with the longest life expectancy are likely to have the largest burden of PAD. The PAD burden will likely increase at a rate proportional to the increases in life expectancy anticipated across the continent. Urbanization and economic development in sub-Saharan Africa are linked to both age and chronic disease risk factor exposure. Specifically, more urban and

higher-income populations are likely to have both longer life expectancy and greater (both in magnitude and duration) exposure to risk factors such as obesity and smoking. This extends the findings of other authors who have explored the role of urbanization and changes in CVD risk in Africa and other LMICs more broadly.[14]

To blunt the effect of the epidemiological transition, the World Health Organization has set a target to reduce deaths caused by non - communicable disease in people younger than 70 years by 25% by 2025 through investing in cost-effective "best buy" interventions. These include cigarette tax increases, increasing public awareness of the benefits of healthy diet and exercise, and providing multidrug therapy to those at high risk for or with CV.[15]

In addition to mitigating the future CVD burden in LMICs, the cost benefits are estimated to be more than US $375 billion by 2025. Furthermore, given that PAD is often the presenting condition for individuals with undiagnosed diabetes or CVD, improving the recognition of PAD by health workers may strengthen secondary prevention efforts in sub-Saharan Africa, including guideline development and dissemination.[14]

3. OBJECTIVES

3.1 General objective

The general objective of this study will be to examine the clinical profile of peripheral arterial disease, risk stratification and to assess interventions and length of stay in patients diagnosed as PAD at the ED in TASH Addis Ababa, Ethiopia, 2018

3.2 Specific objective

- ☞ To describe the clinical and epidemiological profile of Peripheral arterial disease patients in emergency department of Tikur Anbesa specialized hospital
- ☞ To identify the risk factors of Peripheral arterial disease in emergency department of Tikur Anbesa specialized hospital
- ☞ To assess the interventions for Peripheral arterial disease cases in the emergency department of Tikur Anbesa specialized hospital
- ☞ To assess the length of stay of Peripheral arterial disease patients in the emergency department of Tikur Anbesa hospital

4. METHODOLOGY

4.1 Study Area and Period

Ethiopia's health care needs are immense and complicated. This ancient country in the Horn of Africa is home to over 80 million people (in nine regional states), most of whom are unfortunate and live in rural settings. The population is growing rapidly and expected to exceed 100 million by 2020. Despite the progress that has been made to improve access to basic health care for the population (90 per cent of the population has access to the primary health care service. Life expectancy at birth is only 53.4 years for male and 55.4 years for female. The communicable diseases most associated with poverty have been compounded by diseases of urbanization and economic development, such as cardiovascular diseases and vehicular trauma.[11]

Addis Ababa the capital of Ethiopia is one of the nine regional states, has an estimated population of 3.5 million and boasts the highest concentration of industry, commerce and social services in Ethiopia. It has the highest concentration of healthcare facilities and trained healthcare practitioners in the country. The city is almost at the geographic center of the nation, covering an area of 530.14 square kilometers. High population density, urbanization and limited emergency medical service (EMS) infrastructure imposes enormous burden on healthcare delivery systems in Addis Ababa.

The study was conducted at the Tikur Ambesa Specialized Hospital Emergency Department (TASH-ED), a publicly funded tertiary academic teaching hospital affiliated with the Addis Ababa University School of Medicine with an annual ED census of 18,000 patient visits per year. On average, 50 traumatized and/or critically ill patients are seen in the ED per day, and many require emergent or resuscitative care. At the time of this study, the TASH-ED was staffed by EM and off-service residents and interns supported by consultant non-EM faculty.[21]

This study was conducted in the emergency department of Tikur Ambesa tertiary Specialized Teaching hospital in Addis Ababa Ethiopia from September 2016 to May 2018.

4.2 Study design

This study was a retrospective record based quantitative study that examined the clinical profile, risk factors, intervention and length of stay of peripheral arterial disease diagnosed at the ED in Tikur Ambesa specialized teaching hospital in Addis Ababa Ethiopia.

4.3 Source of Population

The source of the study was all peripheral arterial disease cases diagnosed at the emergency department in TASH Addis Ababa Ethiopia.

4.4 Study Subjects

The study subjects' were sample of peripheral arterial disease cases diagnosed at the emergency department in TASH Addis Ababa Ethiopia.

4.5 Inclusion and Exclusion criteria

4.5.1 Inclusion criterion

Criteria Subjects for the study was included all peripheral arterial disease cases medical record with complete information of age above 13 years and gender irrespective of disease severity.PAD patients with intermittent limb claudication and critical limb ischemia will be included.

4.5.2 Exclusion criteria

- Cases with in completed data was excluded

4.6 Sample size determination

- All Patients with PAD diagnosed in the ED from Sep 1st, 2016 to May 30, 2018will be included in the sample.

4.7 Variables

4.7.1 Dependent variables

1. Surgical interventions
2. Peripheral arterial disease diagnosed at the ED

4.7.2 Independent variables

Host related variables

- Socio demographic variables (Age and Sex)
- Clinical features of Peripheral arterial disease
- Length of stay in the emergency department

Environmental related variables

- Province
- Village or city

4.8 Data Collection

Data was collected using data abstraction sheet. Pretest was done and training was given to one health officer working at emergency department in TASTH on how to collect data.

The collected data from reviewed charts was entered in to Statistical Package for Social Sciences (SPSS) Version 21 for analysis. Descriptive statistics was displayed using frequencies and proportions.

4.9 Data quality management

The Data collection was done by trained health officer and Supervision and quality control was done by principal investigator. Continuous assessments were done by advisors.

4.10 Data Analysis and interpretation

Data entry and analysis was performed by using SPSS version 21. First descriptive statistics was carried out to explore the socio-demographic characteristics of the patient, prevalence of peripheral arterial disease, clinical profile and the outcome of the disease and the results was summarized as frequencies and percentages. $P < 0.05$ considered to be statically significant.

4.11 Ethical considerations

Ethical clearance was obtained from Addis Ababa University College of health science Department of Emergency Medicine ethical review committee. Written approval was obtained TASH.

4.12 Dissemination of the result

The study result will be presented to Addis Ababa University, Faculty of Medicine department of emergency medicine and documents will be disseminated to all responsible bodies in the study area, for the hospital where the study is conducted, MOH and Addis Ababa university school of emergency medicine.

5. RESULTS

5.1 Socio-demographic characteristics

A total of 105 recorded data was collected; among them 73(69.5%) were males and 32(30.5%) were females. The mean age of patients was 56.5 years with range of (13-100 year). The highest prevalence of PAD wasat the age range of 57-67 years, 24(22.9%) followed by age range from 46-56 years, 20(19%). (Table 1)

Table 1socio-demographic characteristics of patients with peripheral arterial disease from 2016-2018 in TASH, Addis Ababa, Ethiopia

		Frequency N=105	Percent (%)
Age(year)	13-23	3	2.9
	24-34	14	13.3
	35-45	16	15.2
	46-56	20	19.0
	57-67	24	22.9
	68-78	18	17.1
	79-89	9	8.6
	90-100	1	1.0
Sex	Male	73	69.5
	Female	32	29.5
Residence	Rural	20	19.0
	Urban	85	81.0

Key: N= number

5.2 Risk factors for peripheral arterial disease

From a total of 105 patients, the prevalence of risk factor for peripheral arterial disease was sepsis 38 (36.2%), followed by Hypertension 31(29.5%) and Type 2 diabetes mellitus 30(28.6%) and alcohol 25(23.8%) but history of Smoking was very low 2(1.9%). (Table 2)

Table 2 Risk factors for peripheral arterial disease from 2016-2018 in emergency department of TASH, Addis Ababa, Ethiopia

Risk factors		Frequency (N=120)	Percent (%)
Type of DM	Type 1	1	1.0
	Type 2	30	28.6
	No DM	74	70.5
Hypertension	Yes	31	29.5
	No	74	70.5
Dyslipidemia	Yes	6	5.7
	No	99	94.3
CAD, CVA, CKD	CAD	12	11.4
	CVA	1	1.0
	CKD	3	2.9
	No	89	84.8
Sepsis, HIV, TB, STD	Sepsis	38	36.2
	HIV	4	3.8
	TB	0	0.0
	STD	0	0.0
	No	63	60.0
History of smoking	Yes	2	1.9
	No	103	98.1
	Current	0	0.0
History of alcohol	Past	0	0.0
	Yes	25	23.8
	No	80	76.2

Keys:CAD= coronary artery disease, CVA= cerebrovascular accident, CKD= chronic kidney disease, HIV= human immunodeficiency virus, TB= Tuberculosis, STD= sexual transmitted diseases, DM= diabetes mellitus

5.3 Regional disturbution of peripheral arterial disease

The geographical distribution of prevalence of PAD in this study was Addis Ababa 51.4%, Oromia 24.8%, Amara 12.4%, others 11.4%. Depending on the finding in this study urbanization has very high prevalence 81.0%%.

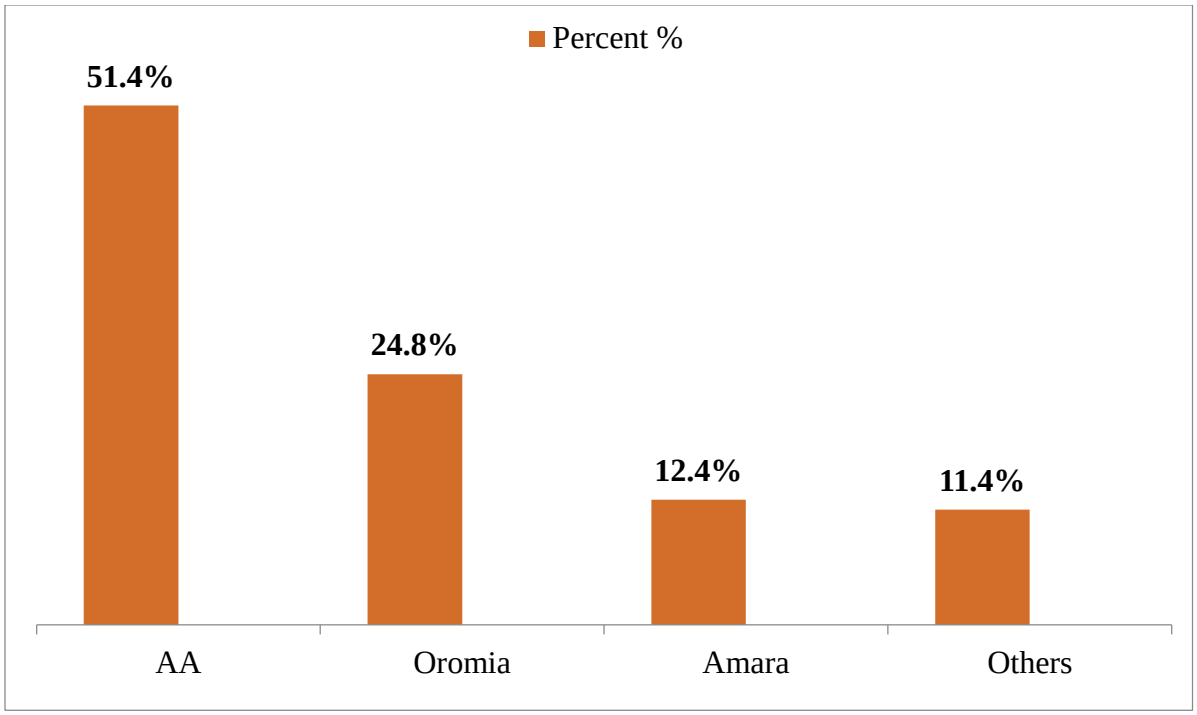

Figure 1Regional distribution of prevalence of peripheral arterial disease from 2016-2018 in TASH, Addis Ababa, Ethiopia

5.4 Clinical features of peripheral arterial disesase at emergency department

A clinical feature of peripheral arterial disease at emergency department wasulcer (74.8%), intermittent claudication (19%) and leg pain (7%). (Fig 1)

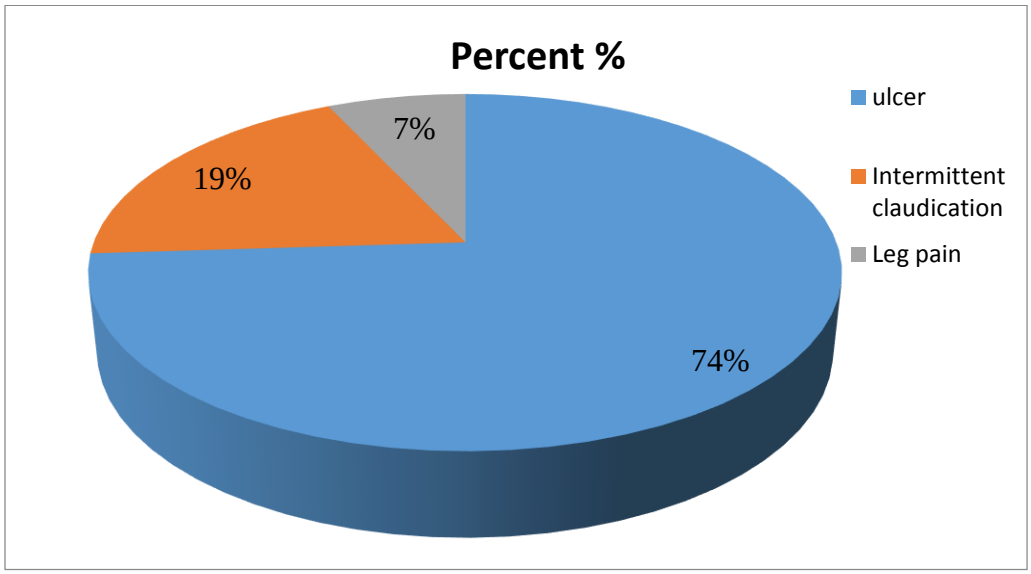

Figure 2 clinical features of peripheral arterial disease of patients at emergency department from 2016-2018 at TASH, Addis Ababa, Ethiopia

5.5Management given to peripheral arterial disease cases

Majority of the subjects were on anti- platelet (69.5%) and (42.5%) were on statin. All the hypertensive subjects were on anti- hypertension 29.5%. There was amputation on 65(61.9%) patients in this study. All the type 2 diabetes 30(28.6%) and 20 subjects from the hypertension were amputated.Table 3)

Table 3 management given and length of stay at emergency department for peripheral arterial disease from 2016-2018 in TASH, Addis Ababa, Ethiopia

		Frequency(N=105)	**Percent (%)**
Anti HTN	Yes	31	29.5
	No	74	70.5
Statin	Yes	45	42.9
	No	60	57.1
Anti-platelet	Yes	73	69.5
	No	32	30.5
Surgical intervention	Revascularization	0	0.0
	Amputation	65	61.9

Key: HNT= hypertension

5.6 Length of stay at emergency department

The highest length of stay at the emergency department was 6 – 10 days for 39(37.1%) of patients followed by 1 – 5 days for 32(30.5%) patients and 11- 15 days 10%. (Figure 3)

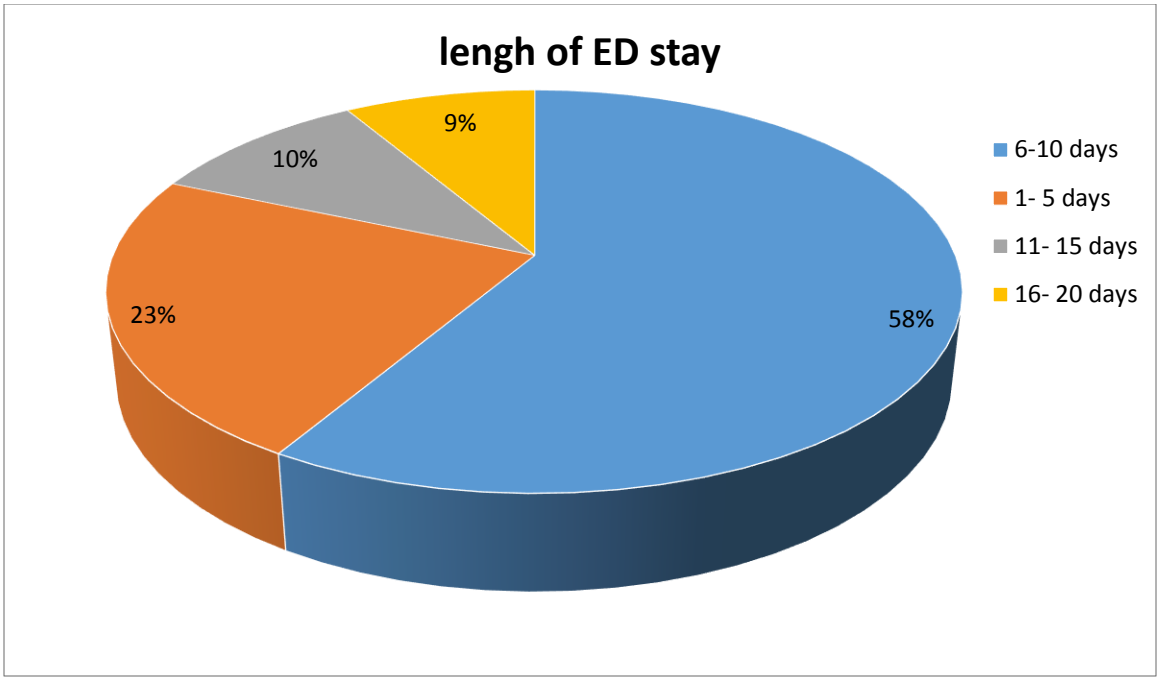

Figure 3 length of emergency department stay of peripheral arterial disease of patients at emergency department from 2016-2018 at TASH, Addis Ababa, Ethiopia

Keys: ED= emergency department

5.7Binary logistic regression

Using binary logistic regression sex has significant association with surgical intervention (P value = 0.013, 95.0% confidence interval 1.276 - 7.816) and sepsis has significant association with surgical intervention (P value = 0.006, 95.0% Confidence interval 1.470 - 9.985).

Table 4 Binary logistic regression

Variables	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
sex	1.150	.462	6.186	1	.013	3.158	1.276	7.816
SEPSIS	1.343	.489	7.554	1	.006	3.831	1.470	9.985

6. DISCUSSION

The results of the present study indicate that the prevalence of peripheral arterial disease in males is higher than in females and this makes this study different from the previous studies done in sub-Sahara Africa. In southwestern region of Nigeria prevalence of peripheral arterial disease was higher in females than in males but in that study number of females was dominant.[19] Among adult diabetes patients in southwestern Uganda female sex was associated with PAD and this pattern may be because females generally outnumber males in the Ugandan population and, in addition, they tend to have better health seeking behavior.[22] In our study small sample size could be another factor that might lead to underestimation of the prevalence of peripheral arterial disease in females.

The overall prevalence of PAD in this study has been estimated to range from 22.9% in the population 57-67 years, 19% in the younger population 46-56 years, and 17.1% in the older population 68-78 years and then 15.2%, 13.3% in the age group 35-45, 24-34 years respectively. Thisfinding shows peripheral arterial disease is higher in the older age groups but it did not increase with age; rather it is higher in the younger age groups and this finding is different from the worldwide trend of PAD.

A cross-sectional descriptive study on the prevalence of peripheral arterial disease in diabetic subjects in south-west Nigeria in 2012showedthe occurrence or development of PAD increases with age.[7]Globally prevalence of PAD is estimated to be 10%–25% in people aged ≥55 years and increases to approximately 40% in community populations aged >80 years.Prevalence of PAD in Japan increases with age.[16]

In this study we found that sepsis has high prevalence 36.8%; among them 27 males and this has relation with other studies that showed a possibility role of infection in the pathogenesis of PAD. Immune epidemiological studies have demonstrated associations between prevalence of antibodies to these pathogens and increased risk of cardiovascular diseases, including PAD in previous studies.

Hypertension was second 29.5% followed by alcohol 23.8% and CAD 11.4%. Hypertension has been associated in most epidemiological studies with an increased risk of PAD. Smoking has the lowest prevalence 1.9% and this result may be due to low smoking in the general population.

Regional distribution has greater effect for the development of peripheral arterial disease. The prevalence is highest in urbanized and industrialized areas. This may indicated that industrialization and urbanization are the fast growing risk factors of PAD in low income and developing countries. Therefore the prevalence of industrialization has similar finding with studies done in developing countries. Addis Ababa has the highest prevalence of PAD 51.4% followed by Oromia 24.8%, Amara 12.4% and others 11.4%.

In Sweden nationwide cohort study in 2017,despite younger age and substantial risk of future major CV events, patients with primary PAD received less intensive secondary preventive drug therapy.[11]In this study majority of the subjects were on anti- platelet (69.5%) and (42.5%) were on statin.Our findings suggest that risk prevention should be the key strategy in the management of patients with PAD: positive lifestyle changes should be encouraged, and patients with PAD should be prescribed secondary preventive drug therapy with antiplatelet therapy and statins at hospital discharge.

Current recommendations for PAD include regular antiplatelet therapy and as-needed treatment with statins and antihypertensive drugs to achieve target values for serum lipids and blood pressure, respectively.[23, 24]In this study all the hypertensive subjects were on anti- hypertension 29.5%.

A retrospective study done TASH Ethiopia in 2002, among the 35 patients who lost their limbs as a result of gangrene, 24 had vascular insufficiency of which nearly 11 were associated with diabetes.[25]A study done in Ayder hospital (2018) PAD was the third cause of amputation(20.7%), in diabetes(8%) and it was mainly seen after the age of 45 years in 15 patients out of 18.[26]Similar study done in Tanzania in 2012the most common indication for major limb amputation was diabetic foot complications in 41.9%, vascular disease in 8.6% and lower limbs were involved in 86.4% of cases.[27]The outcome of PAD in this study is 61.9% amputation. The amputated subjects were 51 males and 14 females. All the type 2 subjects and 20 hypertensive subjects wereamputated.

Emergency department Length of stay is considered a key measure of emergency department throughput, and from the perspective of the patient, it is perceived as a measure of healthcare service quality. In Israelobservational study in 2015 demonstrate a general average total emergency department LOS of 438 min. Significant differences in average LOS were found

between admitted patients (Mean = 544 min, SD = 323 min) and discharged patients (Mean = 291 min, SD = 286 min). The Accident & Emergency (A&E) target introduced in England in 2001 required hospitals to see, treat or discharge 98% of patients within four hours.[28]

Research into Australia's National Emergency Access (four hour) Target (NEAT) also shows some improvements attributable to the introduction of time targets in 2009.[29, 30]In July 2009, the New Zealand government introduced the 'Shorter Stays in ED' target which required that in all population fund hospitals, 95% of patients would be admitted, discharged, or transferred from an ED within 6 h.[31]

In this study the length of stay in the emergency department was 6 – 10 days 37.1%, 1 – 5 days 30.5% and 11 – 15 days 22.9% and this demonstratethere was prolonged emergency department length of stay as the emergency time target 24 hours. Emergency care in sub-Saharan Africa: Results of a consensus conference (2013)acute care facilities at and above the district level should provide 24 h care.[32]

High LOS may lead to increases in expenditures and may have implications for patient safety, whereas certain organizational changes, communication improvement, and time management may have a positive effect on it. Interdisciplinary methods can be used to explore factors causing prolonged emergency department LOS and contribute to a better understanding of them.

7. LIMITATION OF THE STUDY

The limitations of this study were; first there was small sample size, second retrospective chat review study; for example lipid profile was found only in 6 subjects; therefore it was difficult to identify risk factors from recorded data. Third this study was done in tertiary referral hospital. Fourth it was a single - center study. Therefore is difficult to generalize the prevalence of the general population.

8. CONCLUSION

We concluded that the prevalence of PAD in males is twice than in females in this study. The prevalence of "traditional" cardiovascular disease risk factors such as hypertension, diabetes, and

alcohol was high among persons with PAD. Urbanization and sepsis have high prevalence .Most subjects had prolonged length of study in the emergency department.

9. RECOMMENDATION

- Awareness of the dramatically high prevalence of LEA rate after PAD serves as a call to action for clinicians and policy makers.

- The underlying reason for this poor recognition is the public's lack of awareness of the signs and symptoms of PAD. Therefore the first step to reducing LEA is improved recognition of lower extremity PAD by both patients and clinicians.

- Evidence-based treatments for atherosclerosis, such as antiplatelet agents, statins, and risk factor modification, are the mainstay of medical therapy for PAD.

- An evolution in medical, endovascular, and surgical therapies aimed at improving PAD should be done.

- Further research is essential in understanding "best practices" in imaging and preamputation testing prior to LEA.

- More research is necessary to assess risk factors in the general population and to determine theeffects of endovascular versus surgical revascularization with regard to enhancing limb preservation.

- Moving forward, clinicians and policy makers must continue to devise innovative ways to deliver high-value clinical care to patients with PAD.

- Ultimately, our goal is to create a system to encourage necessary interventions for those PAD patients who would benefit from them the most.

REFERENCES

1. Hills AJ, Shalhoub J, Shepherd AC et al. Peripheral arterial disease. Br J Hosp Med 2009; 70:560–5

2. Corey A. Kalbaugh, PhD, MS; Anna Kucharska-Newton, PhD, MPH, Peripheral Artery Disease Prevalence and Incidence Estimated From Both Outpatient and Inpatient Settings Among Medicare Fee-for-Service Beneficiaries in the Atherosclerosis Risk in Communities (ARIC) Study, Journal of the American Heart Association (2017),1161
3. Norgren L, Hiatt WR, Dormandy JA et al. Inter-society consensus for the management of peripheral arterial disease (TASC II). J Vasc Surg 2007; 45 (Suppl. S):S5–67
4. Fowkes FG, Housley E, Cawood EH et al. Edinburgh artery study: prevalence of asymptomatic and symptomatic peripheral arterial disease in the general population. Int J Epidemiol 1991; 20: 384–92
5. Hiatt WR. Medical treatment of peripheral arterial disease and claudication. NEJM 2001; 344: 1608 – 21
6. Becker F, Robert-Ebadi H, Ricco J-B et al. Management of critical limb ischaemia and diabetic foot. Clinical practice guidelines of the European Society for Vascular Surgery. Chapter 1: definitions, epidemiology, clinical presentation and prognosis. Eur J Vasc Endovasc Surg 2011; 42 (S2):S4–12
7. Berridge D, Kessel D, Robertson I. Surgery versus thrombolysis for initial management of acute limb ischaemia. Cochrane Database Syst Rev 2009; (2).doi: 10.1002/14651858
8. F. Gerry R. Fowkes, Victor Aboyans, Peripheral artery disease:epidemiology and global perspectives 2016, 1038
9. F Gerald R Fowkes, Diana Rudan, Igor Rudan, 2013 Comparison of global estimates of prevalence and risk factors for peripheral artery disease in 2000 and 2010: a systematic review and analysis 2013,1016
10. Bhatt, D. L. et al. International prevalence, recognition, and treatment of cardiovascular risk factors in outpatients with atherothrombosis. JAMA 295, 180–189 (2006)
11. Birgitta Sigvant, MD, PhD, Pål Hasvold, MSc Pharm, Björn Kragsterman, MD, PhD, Karlstad, Stockholm, Mölndal, Uppsala, and Gothenburg, Sweden, Journal of Vascular Surgery 2017, Cardiovascular outcomes in patients with peripheral arterial disease as an initial or subsequent manifestation of atherosclerotic disease: Results from a Swedish nationwide study, jvs.2017.01.067

12. Perk J, De Backer G, Gohlke H, et al; European Association for Cardiovascular Prevention & Rehabilitation (EACPR); ESC Committee for Practice Guidelines (CPG). European Guidelines on cardiovascular disease prevention in clinical practice (version 2012). The Fifth Joint Task Force of the European Society of Cardiology and Other Societies on Cardiovascular Disease Prevention in Clinical Practice (constituted by representatives of nine societies and by invited experts). Eur Heart J 2012; 33:1635-701
13. Cheryl Hunchak, Sisay Teklu, Nazanin Meshkat,Patterns and predictors of early mortality among emergency department patients in Addis Ababa, Ethiopia (2015) 8:605
14. Lily E. Johnston, MD, MPH; Barclay T. Stewart, MD, MscPH, Peripheral Arterial Disease in Sub-Saharan Africa A Review(2016)0446
15. WHO plan 2014 for NCDs
16. Smriti Murali Krishna, Joseph V. Moxon and Jonathan Golledge (2015) A Review of the Pathophysiology and Potential Biomarkers for Peripheral Artery Disease(2015), Molecular Sciences,3390
17. Selvin, E. et al. Meta-analysis: glycosylated hemoglobin and cardiovascular disease in diabetes mellitus. Ann. Intern. Med. 141, 421–431 (2004)
18. Feliciano Chanana Paquissi, Arminda Bimbi Paquissi Cuvinje, and Almeida Bailundo Cuvinje Prevalence of Peripheral Arterial Disease among Adult Patients Attending Outpatient Clinic at a General Hospital in South Angola, Scientifica Volume 2016, Article ID 2520973
19. Samson Okello, Alexander Millard, Rogers Owori, Prevalence of lower extremity Peripheral artery disease among adult diabetes patients in Southwestern Uganda, BMC Cardiovascular Disorders 2014, 14:75
20. Bolaji O. Oyelade, Akintayo D. OlaOlorun, Louis O, The prevalence of peripheral arterial disease in diabetic subjects in south-west Nigeria, AOSIS OpenJournals 2012, 4102
21. Cheryl Hunchak, Sisay Teklu, Nazanin Meshkat,Patterns and predictors of early mortality among emergency department patients in Addis Ababa, Ethiopia (2015) 8:605
22. Murray, C. J. et al. Disability-adjusted life years (DALYs) for 291 diseases and injuries in 21 regions, 1990 2010: a systematic analysis for the Global Burden of Disease Study 2010. Lancet 380, 2197–2223 (2012)

23. 34. Berger JS, Katona BG, et al. Design and rationale for the Effects of Ticagrelor and Clopidogrel in Patients with Peripheral Artery Disease (EUCLID) trial. Am Heart J 2016;175:86-93
24. Pande RL, Perlstein TS, Beckman JA, Creager MA. Secondary prevention and mortality in peripheral artery disease: National Health and Nutrition Examination Study, 1999 to 2004. Circulation 2011;124:17-23
25. Manyazewal Dessie, Preventable amputations in Ethiopia 2002
26. Berhe Gebreslassie, Kibrom Gebreselassie,Patterns and Causes of Amputation in Ayder Referral Hospital, Mekelle, Ethiopia: A Three-Year Experience (2018) ejhs.v28i1.5
27. Phillipo L Chalya1, Joseph B Mabula1†, Ramesh M Dass,Major limb amputations: A tertiary hospital experience in northwestern Tanzania 2012, 7:18
28. Mason S, Nicholl J, Locker T. Four hour emergency target. Targets still lead care in emergency departments. BMJ (Clinical research ed). 2010; 341
29. Stokes B. Four Hour Rule Program Progress and Issues Review. Department of Health WA; 2011 December 2011
30. Sullivan CM, Staib A, Flores J, Aggarwal L, Scanlon A, Martin JH, et al. Aiming to be NEAT: safely improving and sustaining access to emergency care in a tertiary referral hospital. Aust Health Rev. 2014;38(5):564–74
31. Ardagh M. How to achieve New Zealand's shorter stays in emergency departments' health target. N Z Med J. 2010; 123(1316):95–103
32. Emilie Calvello, Teri Reynolds, Jon Mark Hirshon, Emergency care in sub-Saharan Africa: Results of a consensus conference, afjem.2013.01.001

1. STANDARD DATA ABSTRACTION SHEET

1. Age . Date of admission . Date of discharge .
2. Sex Male |___| Female |___|
3. Ethnicity .
4. Family history of PAD Yes |___| No |___|
5. Diabetes DM1 |___| DM2 |___|
6. Hypertension Yes |___| No |___|
7. Antihypertensive Yes |___| No |___|
8. Dyslipidemia Yes |___| No |___|
9. Statin Yes |___| No |___|
10. Antiplatelet Yes |___| No |___|
11. CVD |___| CVA |___| CKD |___|
12. Sepsis Yes |___| No |___|
13. HIV |___| STDs |___| TB |___|
14. Smoking Yes |___| No |___| if yes past |___| current |___|
15. Alcohol Yes |___| No |___|
16. Leg pain Yes |___| No |___| if yes

    At rest |___| exercises |___|

    Intermittent claudication |___| leg ulcer |___|
17. Surgical interventions Yes |___| No |___| if yes

    Amputation |___| revascularization |___|
18. Region 1. A.A |___| 2. Oromia |___| 3. Amara |___| 4. Others |___|
19. Residence place 1.Rural |___| 2. Urban |___|