CORONARY ARTERY DISEASE IN YOUNG ADULT PATIENTS UNDERGOING CORONARY ANGIOGRAPHY AT JKCI: PREVALENCE AND RISK FACTORS

Elifuraha Nicholao, MD

MMed (Internal Medicine)

Muhimbili University of Health and Allied Sciences

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Muhimbili University of Health and Allied Sciences

School of Medicine

Department of Internal Medicine

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By

Elifuraha Nicholao

A dissertation submitted in partial fulfillment of requirement for the degree of Master of Medicine in Internal Medicine

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CERTIFICATION

The undersigned certifies that they have read and hereby recommend for acceptances by the Muhimbili University of Health and Allied Sciences a dissertation entitled; coronary artery disease in young adult patients undergoing coronary angiography at JKCI: prevalence and risk factors in partial fulfillment requirement for the degree of Master of medicine in Internal Medicine of the Muhimbili University of Health and Allied Sciences.

_____
Professor Mohamed Janabi
(Supervisor)

_____

Date_____
Dr Tulizo Shemu
(Co-supervisor)

Date_____

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ABSTRACT

Background: Coronary artery disease (CAD) is characterized by decrease in blood flow to the myocardium brought by formation of atherosclerotic plaques in the heart's blood vessels. Premature Coronary Artery Diseases transpires in men and women before the hit 45 and 55 years of age, respectively. CAD is expounded as CAD observed in men aged more than 55 years of age and in women aged more than 65. (9) It is one among the Non-Communicable Diseases that possess a major challenge to the health system worldwide and attains top cause of death globally, contributing to number exceeding 350,000 annually in USA.

Objective: To determine the prevalence, associated cardiovascular risk factors and coronary angiographic profile among the patient clinically diagnosed with premature coronary artery diseases and scheduled for coronary angiograph at Jakaya Kikwete Cardiac Institute (JKCI).

Methodology: A prospective cross-sectional study was conducted involving patients with Premature CAD.The study was done for 7 months beginning from september 2023 to march 2024. It was conducted in Dar es Salaam- Tanzania at JKCI, the only cardiac institute in Tanzania. The target population was all patients who were admitted due to clinical diagnosis of CAD and schedulled for coronary angiography at JKCI during the study period.Cases were Consecutively recruited to meet the targeted sample. Patients admitted due to CAD and scheduled for coronary angiography aged 18 and above were enrolled after they had read, understood and sign the consent form**.** A standardized questionnaire administered by researcher and the assistant was used for data collection from the participants and also from the patient hospital record. The following data were collected; social demographic characteristics(sex, age, residency, occupation and education level), physical activities status, history of alcohol use, blood pressure, blood sugar, electrocardiogram finding, family social history, laboratory parameters (total cholesterol, triglycerides and low density lipoprotein,) and angiographic results from CATH-LAB. Participants were categorized as premature CAD encompassing men aged 45 years and below and women with 55 five years and below based on the life expectancy in Tanzania. Matured CAD encompasses participants aged 60 and above. The collected data was entered in SPSS version 23 and summarized as means and proportions. Multivariate analysis was used for analyzing confounding in all variables with a p value <0.2 in bivariate analysis where those variables with a p value <0.05

was documented as being statistically significant. Logistic regression technique was used to determine the associations of variables.

Results: The prevalence of the angiographically documented premature CAD was 14.9 %. Participants with PCAD had higher rates of low physical activities (p=0.01), hyperlipidemia (p =<0.00001), obesity (p=0.00001), positive family history of coronary artery disease (p = <0.00001), single vessel disease (p = 0.013), NSTEMI presentation (0.216) and alcohol use (p = 0.018). Logistic regression model indicated that male sex (OR 3.8, C.I 1.43–6.73), obesity (OR 3.3, C.I 1.13–9.63), low level of physical activity (OR 1.72, C.I 1.11–2.66) and positive family history of coronary artery disease (OR 1.97, C.I 1.28–3.03) were associated with the premature CAD.

Conclusions: The study highlights the alarming prevalence of premature CAD in the country, predominantly affecting men with low physical activity, obesity, and family history of heart disease as key independent risk factors. Controlling modifiable risk factors is crucial to reducing the incidence and impact of premature CAD.

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LIST OF ABBREVIATIONS

ACS	Acute Coronary Syndrome
AF	Atrial Fibrillation
CABG	Coronary Artery Bypass Grafting
CAD	Coronary Artery Disease
CAG	Coronary Angiography
CATH-LAB	Catheterization theaters
EF	Ejection Fraction
FH	Family History
LAD	Left Anterior Descending Artery
LCX	Left Circumflex Artery
MCAD	Mature Coronary Artery Disease
NPV	Negative Predictive Value
NS-STEMI	Non-ST-Segment Elevation Myocardial Infarction
PCAD	Premature Coronary Artery Disease
PCI	Percutaneous Coronary Intervention
PCI	Percutaneous Coronary Intervention
PPV	Positive Predictive Value
QCA	Quantitative Coronary Angiography
RCA	Right Coronary Artery
STEMI	ST-segment Elevation Myocardial Infarction
VD	Vessel Disease

DEFINITION OF KEY TERMS

Premature coronary artery disease. This is CAD which happens before age 55 and 65 in male and female respectively according to WHO definition.

Electrocardiogram. Measures the electrical activity of the heart. Its patterns visualized on screen or special printed paper signifies the various conditions cardiogenic conditions.

Echocardiogram. These are sound waves that enables visualization of the structural and functional aspects of the heart.

Exercise stress test. This is the treadmill which evokes signs and symptoms which occur most often during exercise.

Cardiac catheterization and angiogram. This is insertion of flexible tube into the blood vessel which advances to the heart under guidance of x-ray to instil the dye for better view of the vessel

Coronary angioplasty. This procedure is used to clear clogged heart arteries. Percutaneous coronary intervention is another name for it. It is done by experienced interventional cardiologist and imaging guidance to the spot of insult whereby appropriate intervention id done.

Coronary artery bypass graft surgery. A healthy blood vessel harvested from other body parts body to create a bypass for the narrowed or blocked coronary artery

CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Coronary artery disease is characterized by decrease in blood flow to the myocardium brought by formation of atherosclerotic plaques in the heart's blood vessels. PCAD transpires in men and women before the hit 45 and 55 years of age, respectively. These cut-offs vary from 45 to 65 years of age, as evidenced by various studies. (4, 5). PCAD is used indistinguishably with Early-onset CAD (8). CAD is expounded as CAD observed in men aged more than 55 years of age and in women aged more than 65. (9) It is one among the NCD that possess a major challenge to the health system worldwide and attains top cause of death globally, contributing to number exceeding 350,000 annually in USA.

The proses of atherosclerotic plaque formation emanates early in life, however the interplay of the environmental and genetic factors adds more fuel to the condition. Universally, the prevalence of CAD is 154 million.

The occurrence of PCAD is an interplay between modifiable and non-modifiable risk factors. Off those who diagnosed with PCAD, more than four-fifths possess minimum of single modifiable risk factor.

Smoking with its entities, HTN, DM, inactivity, Higher BMI (obesity), hyperlipidemia, and psychosocial stress are all known modifiable risk factors associated with PCAD. While gender, ethnicity, age and a familial history of heart disease implies genetic predisposition and thus unmodifiable.

Since PCAD and late onset CAD are multifactorial disease encompasses modifiable and non-modifiable risk factors, then it is of paramount to understanding the interaction of these factors as the key nucleus for the prevention of morbidity, mortality and other social-economical devastations associated with PCAD.

1.1.1 The pathogenesis of PCAD

Generally, there are no pure distinction between the pathogenesis of PCAD and late onset coronary artery disease. It manifests following atherosclerosis deposits on the sub-endothelial lining of the coronary arteries. As a result of atherosclerosis, the arterial lining

becomes hardened, stiffened and accumulates deposits of calcium, lipids and inflammatory cells to form a plaque. The stiffening of the artery makes it to lose its elastic nature causing partial or total obstruction to blood flow. This makes myocardium short of blood supply, oxygen and nutrients and therefore inability to meet the physiological demand.(1)

1.1.2 Associated factors for premature coronary artery diseases

There are various factors contributing to the development of PCAD. These factors are categorized into non-modifiable factors inclusive age, sex, ethnicity and family history of heart disease and modifiable factors includes lack of physical activity, obesity, ciggarrate smoking, and alcohol. Development of CAD is the complex interplay between these factors over a duration of time. (21, 26)

1.1.2.1 Coronary artery disease in the family

Premature coronary artery diseases are prevalent among the persons with familial history of CAD in varying patterns as showing in study done in Iran.(30).Further consolidation is showing by studies done from Turkey with even higher percentages of positive family history.(31)

1.1.2.2 Sex

Been a male or a female has a substantial role in risk profiles on the incidence of PCAD. Women attains the first episode of CAD at 10 years older than men. This is attributed to protective effect of hormones. Nevertheless women tend to exhibit bizarre or atypical presentations of CAD symptoms notably abdomen cramps, nausea and vomiting and indigestion.(11,32)

1.1.2.3 Age and the CAD

Age is prominent independent risk factor for cardiovascular diseases, previously CAD was thought to be the disease of the elderly however the reciprocation of the fact is currently evident. With aging the likelihood of developing of HTN among other NCD tend to increase by 77.8% among women and 70.8% among males in the range of 65–74 years.(33,34)

1.1.2.4 Diabetic Melitus

DM is perhaps undoubtedly chief risk factors for CVD. There is a prevalence of 70% to 80% for elevated LDL, 75% to 85% of hypertension, and 60% to 70% for obesity with

respect to adults with DM.(35) Death due to cardiovascular causes in all age groups and both sexes with DM are strongly correlated, CAD is the major death etiology in DM by two to four folds. (36) Furthermore, patients with DM and CAD have worse prognosis with increased mortality .(37)

1.1.2.5 Obesity

Extremely large BMI accounts for pronounceable strong predictor for CAD. Young adults have two to three times risk elevation risk to CAD when they have extremely large BMI unlike peer with normal weight. The risk is seven times more higher in older adults when compared to normal weight counterpart. (21,26)

1.1.2.6 Level of physical activity

With no physical limitation, WHO recommends moderately intensity exercise for 150 minutes or vigorous exercise for 75 minutes per week as a means to reduce risk for NCDs including CAD. Studies have shown moderate physical activity per week is protective against CAD. Physical inactivity is a contributory factor to nearly 3.2 million deaths worldwide(38). There is approximately Thirty percent of elevated risk of all-cause of mortality due to NCDs in physically inactive population.(38,40)

1.1.2.7 Hyperlipidemias

It has been showing that the presence of cholesterol and triglycerides is associated with myocardial infarction and worsening of CAD as they are the important precursors in the formation of atherosclerotic plaque.(39)

1.1.2.8 Cigarette smoking

Globally, more than one billion individuals are smokers.(3) Smoking escalates the risk of developing CAD through aggravation of small and large-blood vessel complications of coronary system. Though the exact mechanisms underlying CAD is still an area of study but smoking is attributed to inflammation and dyslipidemia. Moreover, three-quarter of smokers is located on developing countries where tobacco-related diseases and deaths are higher Smoking 20 cigarettes per day in a year has two times increased risk of developing CAD among smokers. In Tanzania the prevalence of smoking doubled from 7.9% to 15.2% from 2008 to 2012 and it is a major contributor of CVDs.(40,41)

1.1.2.9 Alcohol

Alcohol consumption and ten-year cardiovascular risk are related in J-shaped manner. Alcohol consumption in moderation mentioned as 14 and 7 units per week in male and female respectively is associated with higher HDL levels which are cardio-protective. At a higher level of consumption above those units pre-specified, the protective effect vanishes due to associated dyslipidemias. A study conducted in Scottish men reveled high CAD mortality in heavy drinkers was tied to the Hypertension. (42,43,44)

1.1.2.10 Hypertension

Hypertension is a major risk factor for global mortality, accounting for 13% of all deaths and accounting for more than 45% of all CAD deaths.(42) Hypertension and CAD are linearly correlated, studies have shown that hypertension affects approximately 70% of patients with PCAD. The prevalence of hypertension is showing to be high in those previously diagnosed with PCAD(43). Nearly 31.6% of men and 29.4% are hypertensive, and the likelihood of demise from NCDs, including CVDs, were estimated to be 16%.(44)

1.1.3 Clinical Characteristics of PCAD

Clinical features of PCAD are nonspecific, manifestation of symptoms can categorically be grouped as sudden cardiac death, asymptomatic, stable angina, acute coronary syndrome (unstable, NSTEMI, and STEMI)(1). Stable angina presents with mid-sternal chest pain, squeezing, feeling of constriction, anxiety, radiation to the arms, neck, jaw, back or upper abdomen. In stable unlike unstable angina, strenuous activities tend to increased oxygen demand and so exaggerate the symptoms while resting alleviate symptoms. The chest pain that worsens with cold environment, emotional and strenuous activities point out to be more likely stable angina. The patient experiences pain relief from rest and vasodilators. Conversely unstable angina evokes pain at rest that lasts over half an hour and does not relieve with nitroglycerine. On the other hand, pain associated with sweating, change of bowel habit such as nausea and vomiting may suggest MI. Also women can be dissimilar to men in terms of symptoms, with shortness of breath been more reportedly from them. Some patients are attended with complications of MI such as HF, VSD or disruption of muscle architecture such as papillary muscle rupture.(2,3,4)

1.1.4 Methods for diagnosing premature coronary artery disease

Proper history and extensive physical examination is paramount for the diagnosis of CAD. Generally, a compatible history with typical features of angina symptoms, reduced exercise tolerance, syncope, pre-syncope, orthopnea, or PND and radiating precordial chest pain should dare the health provider to probe for informative history, perform a physical exam and run diagnostic tests such as ECG, troponins and CK-MBs for patient to name just a few.(5,6)

The suggestive ECG patens should prompt for appropriate management of the case taking into account the time of occurrence of symptoms and the associated comorbidities. However, ECG is not absolute for diagnosis as STEMI is detected in only half of MIs cases confirmed by Troponin and CK-MB. Concomitantly, there are other modalities namely ECHO and cardiac CT among others to aid in diagnostic confirmation.

Moreover, risk factors, age, and the clinical presentation tend to dictate patients mode of investigation and management.(2,7)

1.1.5 Treatment of coronary artery diseases

Treatment for coronary artery diseases can categorically be divided but not restricted to three groups namely life style modification, pharmacological as well as surgical interventions. Lifestyle changes encompasses quit smoking, eating healthy and exercise.

Pharmacological approach entails the use of medications such as Cholesterol drugs for lowering serum cholesterols. These drugs include statins, niacin and bile acid e.tc. Aspirin which helps thinning the blood and prevent blood clots. Beta blockers for slowing the heart rate and lower blood pressure thus reducing the oxygen demand attacks. Other drugs are, Calcium channel blockers. ACE inhibitors and ARB, Nitroglycerin to name just a few.(2,8)

Sometimes the situation may warrant surgery to re-canalize the obliterated arteries, the available choices are, Coronary angioplasty and CABG.(9)

1.1.6 Epidemiology

The big chunk of CAD is in the lower and middle income countries and is mainly fueled by rapid urbanization, globalization, sedentary life and higher risk factors majorly Diabetic

mellitus, obesity, high triglycerides low density lipoproteins levels, and Hypertension. Compared to developed countries, the large sizes of the population in developing countries are comprised of young and middle aged generation. It is documented that, half of the mortality due to cardiovascular diseases in the developing countries were below the age of 70 years, unlike quarter in the developed world, this dates as far back as 1990.(10,11)

1.1.7 Prevalence of coronary artery disease in younger generations

There are some difficulties imposed in determining the extent of CAD among the young mainly due to variations from study to study pertaining to the definition of young adults. There is no proper cut off point of age as some relies on under 35 to under 55 years in diversity of global populations resulting in estimates of 5% to 10% in those with less or equal to 40 years.(12)(13) Moreover about 9% is seen in people with ≤45. This fact indicate the need for for speculative studies endeavoring to probe for and confirm the true burden of CAD in young generation and its multidimensional debilitating effects.(14)

1.2 Problem statements

CAD is chief contributor of morbidity and mortality universally responsible for 0.35 million deaths annually. The prevalence is 154 million, this implies that almost 1/3 of the total world effect of CVD and nearly two percent of the overall global disease burden are due to CAD. Occasionally, CAD is a disease which occurs in late decades of life. These days, however, the reversal of the fact has manifested as even the young adults' encounters the same situation. Maximally ten percent of patient with CAD are less than 45 and 55 years as far as men and women are concerned respectively.(15,16,17)

Premature CAD exhibit diversities from clinical presentation, accompanied risk factors and radiographic vessel profile when compared to Matured or late onset CAD as depicted in various clinical studies.(13,18)

Patients with PCAD are part of an entity group requiring heightened concentration because the deleterious consequents of the disease. The purpose of this study is to probe the prevalence, correlated cardiovascular risk factors, and angiographic pattern of PCAD.

Studies have revealed that over the last three decades the mortality due to late onset coronary artery diseases has depreciated to 5% and 4% among women and men respectively. Contrary to that, the effect is negligible by 0.1% in terms mortality in early onset CAD (<55 years of age). This implies that the early onset of CAD is associated with worse outcome.(19)

Tanzania is equally encountering elevated platform of NCDs, with cardiovascular diseases ranking high. Recent estimates proclaims that, nearly 33% of population in Tanzanian have NCDs of which CVD accounts for 13% of deaths whereby those aged 25 up to 64 are indiscriminately inclusive.(11,20)

Despite the notification of alarming prevalence of PCAD in various overseas localities, no single research study attempted to illuminate on the magnitude of CAD among the young adults in our locality.

1.3 Conceptual Framework

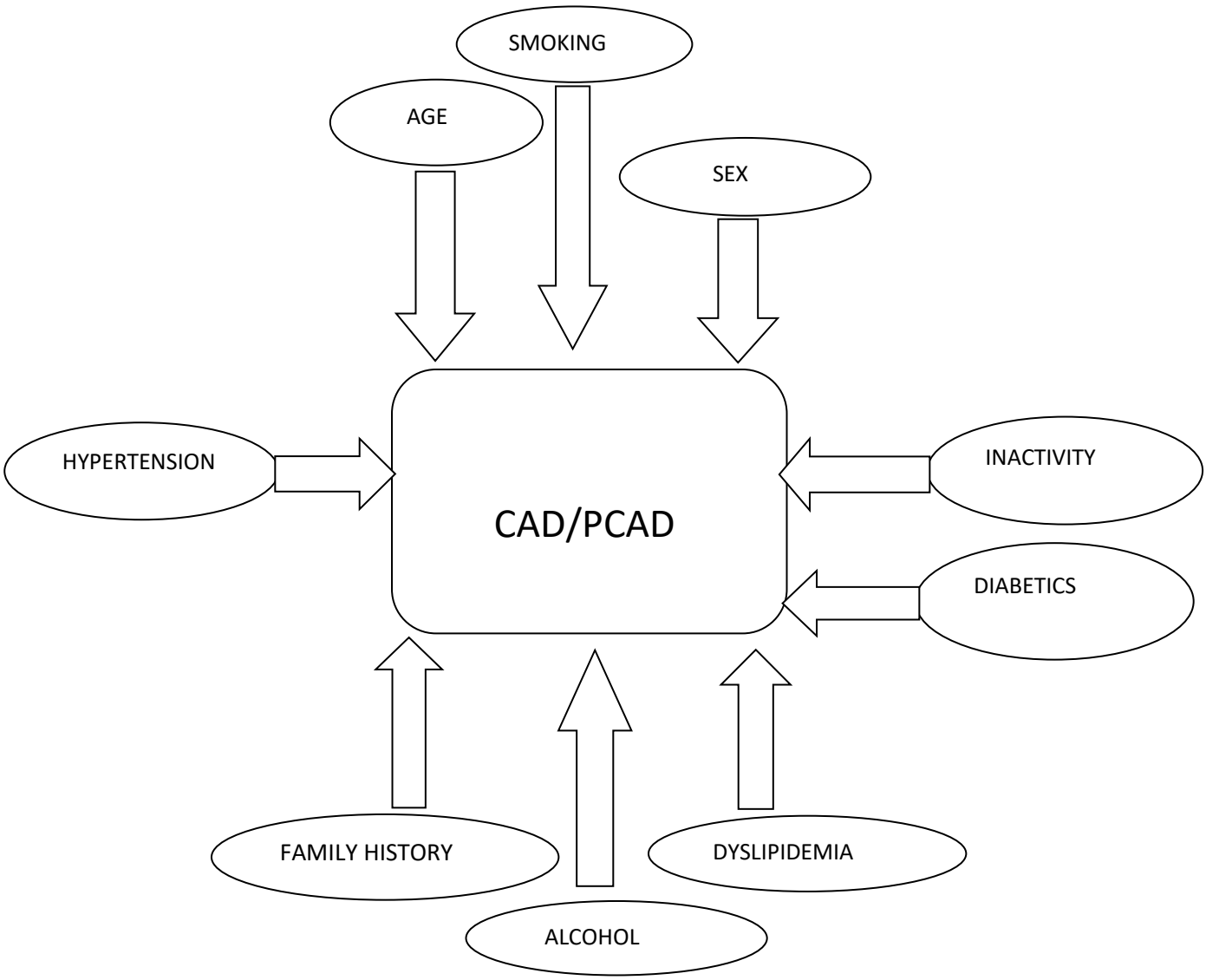


Figure 1. Conceptual frame work shows the interplay between the modifiable and non-modifiable risk factors in the causation of CAD. Single entity can be the cause while the clustering of the factors in the causal relationship is not uncommon.

1.4 Rationale

Data is lacking on prevalence of premature coronary artery Disease and its associated risk factors among the young adults in Tanzania. Understanding the burden and risk factors will enhance risk stratification and preventive strategies for those at risk and or already having premature coronary artery diseases. This study also will serve as a data base for the future similar studies.

1.5 Research question

1.5.1 Main research question

What is the prevalence of premature CAD, its associated risk factors and angiographic patterns among patients with CAD undergoing angiography at JKCI?

1.5.2 Specific research questions

i. What are the social demographic characteristics of patients with premature CAD undergoing angiography at JKCI?
ii. What is the magnitude of premature CAD among patients undergoing angiography at JKCI?
iii. What are the factors associated with premature CAD among patients undergoing angiography at JKCI?
iv. What are the ECG characteristics of a patients with premature CAD undergoing angiography at JKCI?
v. What are the angiographic patterns of patient with PCAD undergoing angiography at JKCI?

1.6 Objectives

1.6.1 Broad Objective

To determine the prevalence and associated risk factors of premature coronary artery disease in young adult patients undergoing coronary angiography at JKCI.

1.6.2 Specific Objectives

i. To describe the social demographics characteristics of patients with PCAD.
ii. To determine the prevalence of PCAD patients among patients attending JKCI.
iii. To describe the risk factors associated with PCAD.
iv. To determine ECG characteristics of patients with premature CAD undergoing angiography at JKCI.
v. To determine angiographic patterns of the patient with PCAD undergoing angiography.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Global view

Study according to Tahir et al in which proportion of CAD was 9%, show that Young and old patients exhibits different portrait in terms of risk factors, presentations, angiographic findings and outcome as far as CAD is concerned. Smoking habit predominates among the mentioned factors. The number of affected vessels as well as degree of atherosclerotic in cases was significantly less in early-onset compared to late-onset CAD. Male sex was predominantly affected.(13)

Study according to Saghir T, Qamar N, Sial J. Showed that patients with less than 40 years had single vessel disease unlike patients with more than 40 years by 39% vs 15% respectively. Angina class I was more pronounceable in under 40s by 51%. DM was more in over 40s by 36% vs 14% in under 40s.(21)

Furthermore Badran HM and his colleague. Showed that the prevalence of smoking, family history, hypertriglyceridemia and low levels of high density lipids was high among the participants whom majority were men of less than 45 years. Prevalence of DM and HT, and wes more common in group with cases with more than 45 years. Single-vessel disease was more apparent in those with less tha 45 years which LAD predominance. Smoking assumed and independent predictor in young patients aged <45 unlike DM in those aged more than 45.(22)

In an attempt to show devastating effects of CAD in Kurdistan, Sadeghi R and his fellow revealed in their study that, among the participants whom mean age was 42.50±5.65 where by male was over represented by 73.6%, smokers were 46.4%, 77.6% had dyslipidemia, 35.2% had hypertension and 26.4% had diabetes mellitus. Family history was showing in 43.2% of cases. Smoking was less implicated in females participants.(23)

Furthermore in study done by Mahjoob MP, Sadeghi S, Khanaman HF, Naderian M and Khaheshi.I, reveled the following, off the 231 patients with CAD who were included in the study, 30.4% younger than 45 years and 50.0% older than 45 had diabetes mellitus. Hypertension were more pronounceable in those above 45 years. Left anterior descending

artery was more involved in older group. One-vessel disease was predominantly high in patients aged below 45.(21)

Also the study done in by Satish P and his colleague encompasses database from Pakistan, China, Indian, Filipinos, Bangladeshi and native individuals. Bangladeshi men had the highest prevalence of CHD by 7.3%, followed by Pakistanis by 6.3%. DM was most prevalent by 17.4% among men, and 22.6% among women. Hyperlipidaemia accounted for 23.6% of men and 18.3% women.(24)

Study done in Iraq by Mohammad, A.M., Jehangeer, H.I. and Shaikhow, S.K. Reveled Prevalence of PCAD to be 31 %. The mean age was 44.2years. Diabetes mellitus among late onset CAD was statistically significant, conversely, hyperlipidemia and positive family history of CAD was higher among PCAD. Single VD lesions and mild coronary stenosis was profound in PCAD unlike three and four VD with moderate to severe coronary stenosis in MCAD.(25)

More over study by Maroszyńska-Dmoch EM and his fellows in a sample with mean age of 35.1 ± 4.4 years of which majority were men by 86.2%. Single-vessel disease was depicted in 61.9% of patients were LAD artery lead by 61.6% with the lipid abnormalities, cigarette smoking and an increased body mass index predominance sequentially. (26)

2.2 Studies done in Africa

The quest for the determination of prevalence of coronary artery disease (CAD) in sub-Saharan Africa to some degree has been ventured utilizing the data dating back as far as 1966 to 1997.Notably, prevalence and circumbulate effects of CAD was found to be relatively low in Africa contrast to developed countries. However the situation is speedy changing explained by lifestyle changes, technological advancement, urbanization the elevated number of tertiary care centers .(27) A systematic review done in Ghana, Nigeria, South Africa, Sudan and Tanzania reported evidence of increased propensity of NCD particularly CVD. (28)

2.3 Study done in Tanzania

There are no official published study done in Tanzania on the account of premature coronary artery diseases and the associated risk factors.

CHAPTER THREE

3.0 METHODOLOGY OF THE STUDY

3.1 Study design

The researcher employed a prospective cross-sectional design in which participants were consecutively recruited.Data of patients with CAD was collected for 7 months, beginning from September 2023 to March 2024. This design allowed the researcher to meet the targeted number of cases for the study.

3.2 Study area

The study was carried out at JKCI, which is the first and only cardiac institute in our country where all referrals from upcountry are admitted. The selected site is flooded by large number of patients from all over the country, this conferred a good opportunity for having representatives from various regions and also a sufficient number for the study.

3.3 Study population

The target population of the study was patients with CAD admitted at JKCI, aged 18 years and above who have read, undestood and signed a written informed concert form to participate in the study. The inclusion criteria was all patient clinicaly diagnosed with CAD and admited with for angiogram.The study excluded cases with CAD symtoms with normal angiographic findings and the cases with repeated angiography was counted only once.

3.4 Sample size determination

The sample size required for this study had been calculated by using formula for cross sectional studies:

$n = Z^2 \times p\,(1-p) / \mathcal{E}^2$

Where:

n = Expected minimum sample size

Z = Standard, corresponding to 95% confidence; 1.96

P = The prevalence of CAD (study done at Iran on PCAD by Mohammed et al) 28%

Ɛ = Maximum permitted error, taken as 5%

$n = 1.96^2 \times 0.28 (1-0.28) / 0.05^2$

n= 310

Taking a none response of 10%

$N = \frac{n \times 100\%}{100\%-10\%}$

$N = \frac{360 \times 100\%}{100\%-10\%}$

N= 345

The number of the patient with coronary artery disease who will be recruited in the study will be 345

3.5 Study Variables

3.5.1 Independent Variables

i. Social demographic characteristics

1) Sex
2) Age
3) Marital status
4) Physical address
5) Education level

ii. Risk for premature Coronary artery diseases

a) Diabetic mellitus
b) Obesity
c) Overconsumption of Alcohol
d) Low Level of physical activity
e) Cigarette smoking
f) Hypertension
g) Family history of heart disease

iii. Laboratory parameters:

a) Level of cholesterol
b) Fasting and random blood glucose

iv. Clinical criterion:

a) Weight in kilograms
b) Height in meters

3.5.2 Dependent variables:

a) Coronary artery disease

3.6 Sampling technique and study procedures

Consecutive sampling method was used whereby the researcher with the researcher assistant with medical knowledge stationed at JKCI were looking for the patients admitted due to clinical diagnosis CAD and scheduled for coronary angiogram. The patients was reviewed by using a Clinical Research Form with questions about social demographic characteristics. After that patients who were diagnossed with CAD was assessed by taking a proper family social history, weighed, height measurements, blood pressure measurement, blood sugar measurement and the blood sample for lipid profile was taken. Thereafter coronary angiographic results was recorded after the procedure mainly focusing on the,type of vessels involved and number of vessels involved.

3.7 Data collection

3.7.1 Interview

Clinical Research form was used to acquire more understanding of the patients' demographic characteristic and family social history. The interviewer used questionnaire to collect patients Particulars regarding the following aspects;

i. Demographics (age, sex, occupation, education, residency.)
ii. History of alcohol use
iii. Smoking history
iv. History of physical exercises
v. History of DM in the family
vi. History of HTN in the family

3.7.2 Observation

The Principle researcher and researcher assistant though face to face interaction actively acquired information from the participants diagnosed with CAD. Also the study involved visualization of the coronary angiograms reports of the patient performed at the CATH-LAB by qualified interventional cardiologists.

Clinical examination

Blood pressure measurement:

Blood pressure measurement was taken using manual mercury sphygmomanometer in the left arm in sitting position were two measurements spaced 1 to 3 minutes apart was taken. The systolic and diastolic blood pressure was recorded as the first and fifth Korotkoff sounds respectively. The mean blood pressure between the two blood pressure measurements was recorded.

Anthropometric quantifications:

i. Eligible participants' weight was taken bare feet using an ISO weighing scale calibrated to allow errors less than 0.5 kilograms.

ii. Heights of participants was measured in nearest centimeters taken using the height-measuring rod with bare feet.

iii. The body mass index was computed using formula: BMI = Weight (kg) ÷ [Height (m)]^2**.** Interpretation was according WHO stipulated standards as normal, underweight, overweight and obese

Investigations:

Participant's recent records on fasting blood glucose and consecutive random blood glucose at two hours post prandial was recorded from daily inpatient clinical charts. Likewise cholesterol level was taken and interpreted per guidelines.

Outcomes

With respect to age at which sign and symptoms emanates and the findings of the CAG, participants was categorized to Premature and mature coronary artery disease arms. Then associated risk factors was evaluated.

3.8 Data processing and analysis

Before entering the data into SPSS for coding and analysis, it underwent initial processing in Microsoft Excel. Statistical analysis was conducted using the Chi-square test to determine significance among variables, with a p-value of less than 0.05 considered statistically significant. Bivariable analysis was employed to assess the initial risk factor analysis for PCAD. To address confounding factors, multivariate analysis was conducted using robust logistic regression modeling.

3.9 Biases and limitations

The following biases and limitations were anticipated to occur:

i. Recall bias on previous history of heart disease and smoking history.

ii. Inter-observer error in reading weight and height recording.

3.9.1 Strategies used to reduce the impact of anticipated biases and limitations:

i. Cross-checking of patients' medical history in medical record.

ii. Research assistant was well trained to calibrate and use of manual sphygmomanometer and weighing scale.

3.10 Ethical considerations

The Muhimbili University of Health and Allied Sciences (MUHAS) Research and Publication Committee granted ethical approval before the commencement of the research. The Director of JKCI provided permission for the research to be conducted at the institute. Eligible participants who were of sound mind were informed about the study objectives, their right to participate or withdraw at any time, and their option to not participate at all. Before enrollments, participants were given written informed consent, and only those who consented were enrolled. Privacy and confidentiality were strictly maintained throughout the study.

3.11 Dissemination

A soft copy of the dissertation is available through the MUHAS Repository and the departmental repository. A manuscript has been prepared for publication in a medical journal.

CHAPTER FOUR

4.0 RESULTS

Flow diagram

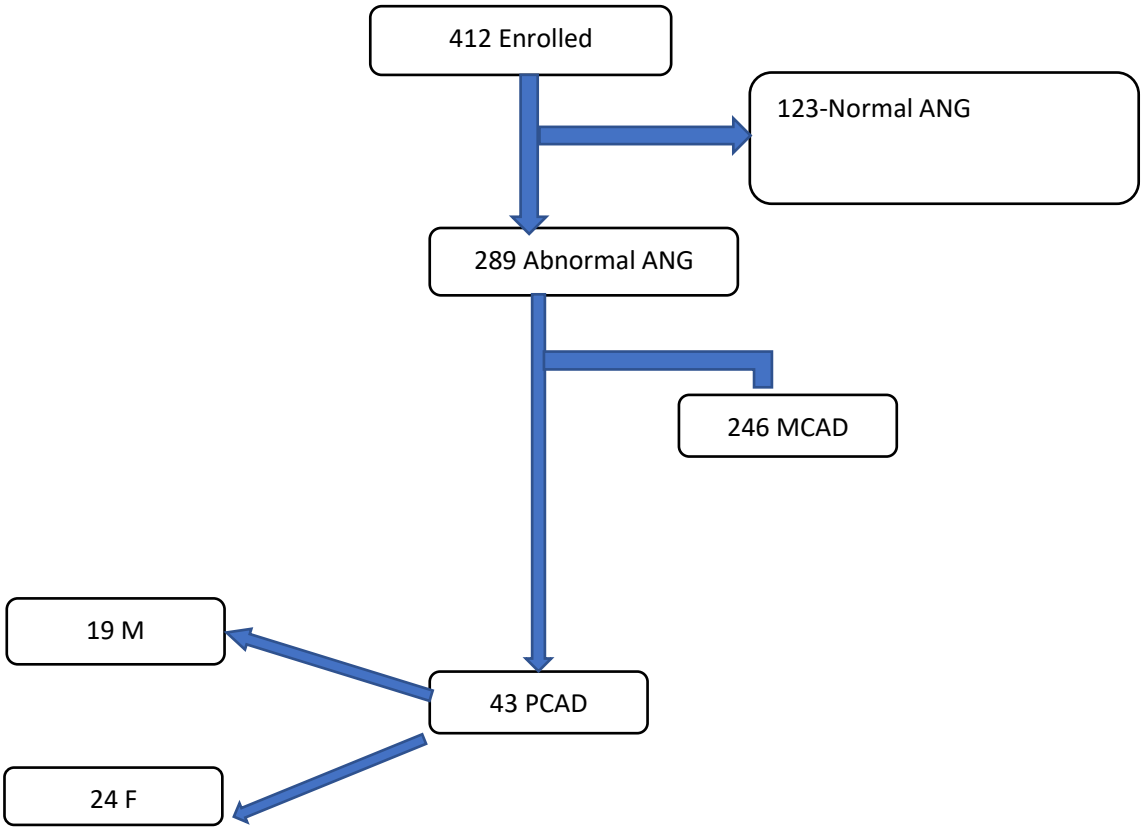


Figure 2: Flow diagram of the recruitment; A total number of 412 was recruited but only 289 patients were eligible for study. A total of 123 participants were eliminated due to normal findings of angiography. Out of which 246 participants aged more than 65 years presented with matured CAD.

4.1 Social-demographic characteristics and Risk Factors Among Young Adult Patients who Underwent Coronary Angiography at JKCI

A total of 289 patients participated in the study, of which 164 (56.7%) were male. The mean age of patients with CAD was 65 years, with a standard deviation of 10.6. The majority of participants were married (208 [72%]). Regarding education level, most participants in both groups had completed secondary school, accounting for 151 (50.7%). Forty-four percent of the participants were retirees, with the majority originating from upcountry regions outside of Dar es Salaam, making up 57.8% of the total participants (see Table 1).

Traditional risk factors for coronary artery disease were assessed among the participants. Diabetes mellitus was present in 118 (40.1%) of the participants, while obesity (BMI > 30 kg/m2) was observed in 53 (20.1%). Consumption of alcohol (more than 21 units for males and more than 7 units for females) per week for more than the past 12 months was reported by 90 (31.1%) participants. Low levels of physical activity were noted in 137 (47.4%), while cigarette smoking was observed in 69 (23.9%) of the participants. Additionally, hypertension was prevalent in 204 (70.6%), and a family history of heart disease was reported by 41 (14.2%) participants. Hyperlipidemia was recorded in 125 (43.3%) of the participants (see Table 1).

As far as electrocardiography presentation is concerned, most of the patients presented as the NSTEMI 123(42.6%) followed by STEMI 100(34.6%) and lastly by stable angina accounting for 66(22.8%) (Table 1).

Table 1: Social demographic characteristics, Risk factors and ECG presentation among the patients who underwent coronary angiography at JKCI

Variable	Frequency, (n)	Percent (%)
Age: Mean=65.0, SD 10.6		
Sex		
Female	125	43.3
Male	164	56.7
Marital status		
Married	208	72.0
Unmarried	45	15.5
Widow	36	12.5
Education level		
Primary and below	62	21.5
Secondary	151	52.2
College/University	76	26.3
Occupation		
Civil servants	18	6.2
Retired	128	44.3
Self-employed	98	33.9
Unemployed	45	15.6
Residence		
DSM	122	42.2
Outside DSM	167	57.8
Cigarette smoking		
No	220	76.1
Yes	69	23.9
Alcohol drinking		
No	199	68.9
Yes	90	31.1
Diabetes mellitus		
No	171	59.1
Yes	118	40.9
Hypertension		
No	85	29.4
Yes	204	70.6
BMI in Kg/m^2		
Underweight	0	0
Normal	150	51.9
Overweight	44	15.2
Obese	95	32.9
Family history of heart disease		
No	248	85.8
Yes	41	14.2
Physical activities		
LI	137	47.4
MI	84	29.1
VI	68	23.5
Level of total cholesterol		
Normal	164	56.7
High	125	43.3
ECG presentation		
STEMI	100	34.6
NSTEMI	123	42.6
Stable Ang	66	22.8
TOTAL	**289**	**100%**

4.2 Prevalence of premature coronary artery disease

A total of 289 patients of which 164 (56.7%) males were enrolled in the study. The Mean age of patients with premature CAD was 47 years with SD 5.6 years. The Prevalence of premature CAD is 14.9 %. (Table 2).

Table 2: Prevalence of Premature Coronary artery disease (PCAD) among young adult patients undergoing coronary angiography at JKCI

Coronary artery disease (PCAD)	Frequency	Percent
Mature	246	85.1%
Premature	43	14.9%
Total	**289**	**100%**

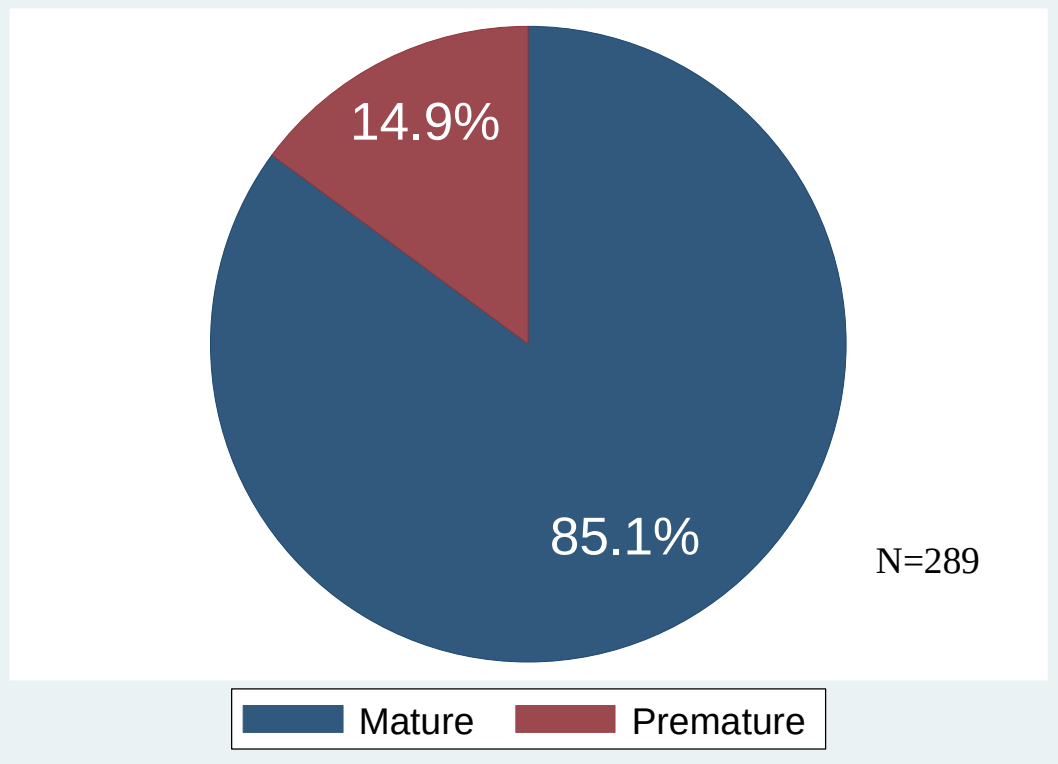


Figure 2: Prevalence of Premature Coronary artery disease (PCAD) among young adult patients undergoing coronary angiography at JKCI

4.3 Risk factors associated with Premature Coronary artery diseases (PCAD) among young patients who underwent coronary angiography at JKCI

Regarding PCAD, the mean age was 47.0 with a standard deviation of 5.6, while for MCAD, it was 63 with a standard deviation of 8.7. Female sex predominated among PCAD (p=0.072). Significant differences in proportions were observed between premature and mature CAD regarding hypertension (p=0.001, 0.029) respectively. Diabetes mellitus was noted more frequently in matured CAD (p=0.004). Additionally, a significant difference in the proportion of hyperlipidemia was observed in PCAD (p<0.00001). Similarly, a significant proportion of obesity (BMI > 30 kg/m2) was observed in PCAD (p<0.0001). The proportion of high cholesterol level deemed significant among the PCAD (p<0.00001). The proportion of low physical activity and alcohol use was higher among individuals with PCAD (P=0.01, P=0.018) respectively. Regarding the family history of coronary artery disease, a significant proportion was observed among cases with PCAD (P=0.002) (refer to Table 3).

Table 3; Risk factors associated with Premature Coronary artery diseases (PCAD) among young patients undergoing coronary angiography at JKCI

Variable	Total 289 100%	Coronary Artery Disease (CAD)		*p*-value
		Mature, 246 (84.1%)	Premature,43 (14.9%)	
Risk factors				
Male	164 (56.7)	145 (58.9)	19 (44.2)	0.072
Overweight BMI(25-30)Kg/m^2	56(19.4)	45 (18.3)	11 (25.5)	0.265
Obese BMI>30Kg/m^2	53(20.1)	40 (16.3)	18 (41.7)	0.0001
Cigarette smoking	69(23.9)	54 (33)	15 (34.5)	0.066
Diabetic mellitus	118(40.1)	109 (44.3)	9 (20.9)	0.004
Alcohol use	90(31.1)	70 (28.5)	20 (46.5)	0.018
Hypertension	204(70.1)	180 (73.2)	24 (55.8)	0.021
Family history of heart Disease	41(14.2)	14 (5.7)	27 (62.8)	<0.00001
LI Physical activities	137(67.8)	110 (38.1)	27 (62.7)	0.011
MI Physical activities	84(29.1)	74 (30.1)	10 (23.3)	0.363
VI Physical activities	68(11.4)	62 (11)	6 (14)	0.209
High Cholesterol	125(43.2)	94 (38.2)	31 (72.1)	<0.00001

4.4 Regression analysis of the socio-demographic and risk factors associated with PCAD among young adult patients who underwent coronary angiography at JKCI

Bivariate and multivariate analysis using Robust Poisson regression was done to identify Factors independently associated with PCAD. After adjusting for confounders,the analysis revealed that Male sex (aPR3.80,95%CI(1.43-4.73),P=0.002), obesity(aPR=3.30 (1.13-9.63),p=0.029), family history of CAD (aPR1.97,95%CI(1.28-3.0,p=0.002) and low level of physical activities(aPR1.72, 95%CI (1.11-2.66),p=0.015) were independent risk factors for PCAD (Table 4).

Table 4: Bivariable and Multivariable Robust Poisson regression analysis of the socio-demographic and risk factors associated with premature coronary artery disease (PCAD) among young adult patients who underwent coronary angiography at JKCI(n=43)

Variable	Bivariable Robust Poisson Regression analysis		Multivariable Robust Poisson Regression analysis	
	cPR (95% CI)	*p*-value	aPR (95% CI)	*p*-value
Sex				
Male	1.66 (0.95-2.89)	0.075	3.80 (1.43-6.73)	0.002
Female	Ref		Ref	
Education level				
Primary and below	0.38 (0.15-0.99)	0.047	0.70 (0.47-1.04)	0.075
Secondary	0.69 (0.39-1.24)	0.216	1.04 (0.77-1.42)	0.783
College/University	Ref		Ref	
BMI				
Normal	Ref		Ref	
Overweight	18.75 (4.31-81.65)	<0.0001	2.60 (0.89-7.63)	0.082
Obese	23 (5.78-97.06)	<0.0001	3.30 (1.13-9.63)	0.029
Cigarette smoking				
No	Ref		Ref	
Yes	1.71 (0.97-3.01)	0.064	1.37 (0.99-1.91)	0.059
Alcohol drinking				
No	Ref		Ref	
Yes	1.92 (1.11-3.32)	0.019	0.79 (0.51-1.23)	0.301
Hypertension				
No	Ref		Ref	
Yes	0.51 (0.30-0.91)	0.021	1.03 (0.70-1.51)	0.867
Family history of heart disease				
No	Ref		Ref	
Yes	17.60 (9.65-32.10)	<0.0001	1.97 (1.28-3.03)	0.002
Physical activities				
VI	Ref		Ref	
MI	0.73 (0.31-1.70)		1.28 (0.82-2.00)	0.270
LI	0.45 (0.25-0.81)	0.008	1.72 (1.11-2.66)	0.015
Level total Cholesterol				
Normal	Ref		Ref	
High	3.39 (1.81-6.34)	<0.0001	0.94 (0.62-1.42)	0.755

*cPR and aPR stand for crude prevalence ratio and adjusted prevalence rati

4.5 ECG presentation among the patients with PCAD who underwent coronary angiography.

In terms of ECG presentation patient were categorized in into stable angina and acute coronary syndromes including STEMI, unstable angina (UA) and NSTEMI. This study found a high proportional rate of NSTEMI/UA among patients with PCAD although this was not statistically significant.

Table 5: ECG presentation among patient with PCAD who underwent angiography

Variables	TOTAL 289(100%)	Coronary artery Disease(CAD)		P-value
		Mature 246 (84.1%)	Premature 43(14.9%)	
STEMI	100(34.6)	90(36.7)	10(23.1)	0.090
NSTEMI/UA	123(42.6)	101(41.2)	22(51.2)	0.216
Stable Angina	66(22.8)	55(22.1)	11(25.6)	0.642

4.6 Angiographic characteristics among patients with PCAD who underwent coronary angiography at JKCI

There was a higher proportion rate of one-vessel disease (1VD) among the participants with premature coronary artery disease (P=0.013). However, the rates of two-vessel disease (2VD) and three-vessel disease (3VD) were high among the mature group (P=0.001, P=0.046) respectively. Regarding the type of vessel involved, LAD was the most common vessel involved, and the least involved vessel was LMS among the patient with PCAD (refer to Table 6).

Table 6: Angiographic characteristics among patients with PCAD and MCAD who underwent coronary angiography at JKCI

Variable	Total; 100%	Mature, 246(85.1%)	Premature, 43 (14.9%)	*p*-value
Number of vessel				
1Vessel Disease	157(54.3)	124(50.4)	33(76.7)	0.013
2Vessel Disease	107(37)	99(40.3)	8(18.6)	0.001
3Vessel Disease	24(8.3)	22(8.9)	2(4.7)	0.046
4Vessel Disease	1(0.3)	1(0.4)	0(0)	0.321
Type of vessel				
LAD	224(46)	145(43.8)	79(50)	0.216
RCA	117(24)	81(24.4)	36(23.2)	0.476
LCX	118(24.2)	83(25)	35(22.6)	0.253
LMS	28(5.7)	23(6.9)	5(3.2)	0.231

CHAPTER FIVE

5.0 DISCUSSION

5.1 Discussion

According to this study, the proportion of PCAD is 14.9%. This proportion is higher than the rates reported by Al-Nozha et al. (5%) in Saudi Arabia (56). However, it is much lower than the proportions documented by Mohammad et al. (31%) in Kurdistan, Maroszyńska-Dmoch et al. (41%) in Poland, and Zahrni et al. in Malaysia, who found 55% of PCAD (25,26,47). Although this study aligns with other global studies, the comparison made between these studies and this one may not reflect the local pattern due to differences in ethnicity, geographical location, level of urbanization, lifestyles cut-off age to define maturity and prematurity due to and the differences in life expectancy .

In this study, family history of heart disease was identified as a significant and independent risk factor for PCAD 62.8% (P=<0.00001). This finding is consistent with the study by Chen et al., who found a positive family history of CAD to be 39% (P=0.034) in premature CAD.(55) Similarly, Nesligul et al. in his study found family history of heart disease to be significant among patients with premature CAD (P=0.021).(51) Genetic and epigenetic factors influence the familial nature of CAD. Individuals with a family history of heart disease should be particularly vigilant about adopting heart-healthy lifestyle habits, undergoing regular cardiovascular screenings, and working closely with healthcare providers to manage any underlying risk factors.

The proportion of obesity in this study was significantly high and identified as a single important risk factor for PCAD (41.7%, p<0.0001). This finding is consistent with the study conducted in Oman by Panduraga et al., which showed a statistically significant findings 72% (P=0.002) among the patient with PCAD. (49) Similarly, a study in Spain by Arzamendi et al. showed the same pattern (65%, p=0.0013) (50). Obesity is fostered by an unhealthy diet with high lipid content and a sedentary lifestyle. This lifestyle is becoming rampant due to rapid globalization and urbanization.

In accordance with the study by Badran, in which the proportion of Diabetic Mellitus among participants with premature coronary diseases was low by 7% (P=0.435) (22), this study similarly showed a low proportion of diabetes mellitus among premature CAD (20.9%, P=0.104). This was also portrayed by Wolfe et al. in his study, which revealed the prevalence to be 3% (P=0.241) among patients with premature CAD (56). This suggests that diabetes is less likely to play a role in the pathogenesis of CAD in young patients.

Dyslipidemia, specifically non-high-density hypercholesterolemia, was found in patients with PCAD (72.1%, P=<0.00001), and this was statistically significant. These results are consistent with a study conducted by Mohamad et al. in Iraq, where significantly higher rates of hyperlipidemia among PCAD (28.7%, P=0.048) were observed.(25)
This suggests the likelihood of non-high-density cholesterol being among the causative agents of premature coronary artery disease in young adults. This can be fostered by poor dietary habits, sedentary as well as genetic error in lipid metabolism.

In this study, the proportion of low levels of physical activity was significantly high and identified as an independent risk factor associated with PCAD (62.7%, P=0.015). A study conducted by Carnethon showed that increasing the frequency of vigorous activities was associated with a 62% lower likelihood of cardiovascular diseases, and the trend across activity levels was statistically significant (P<0.01).(53) Low-level physical activity contributes to the development of CAD through impaired endothelial function, dyslipidemia, insulin resistance, inflammation, and impaired blood flow. Regular physical activity is an essential component of CAD prevention and management, as it helps to reduce these risk factors and improve cardiovascular health.

This study found low prevalence of smoking among the patients with Premature CAD (33% P=0.066). This is antagonist to statistically significant results in studies done by Chen et al (73% P=0.0324) and Abu Sidiqquel et al, (70% P=0.012) portraying high rate of smoking in young patients with CAD. (55, 58). Though this study show low prevalence of smoking among the patients with PCAD but smoking is one of the important modifiable risk factor responsible for various diseases including vascular diseases.

In this study, alcohol consumption beyond recommended units (21 units and 7 units per week for men and women respectively) among the patient with PCAD was proportionally high (46.5% p=0.018). This is consistent with study done by Klatsky et al, which showed high proportion of CAD (59.6%p=0.025) among the heavy alcohol drinkers.(59) Alcohol and cardiovascular diseases have J shaped relationship in that with low to moderate use of alcohol is cardio protective but heavy consumption tend to be associated with high incidence of cardiovascular diseases.

In this study most of patients with premature coronary artery diseases presented with ECG features consistent with acute cute symptom (NSTEMI, 51.2%) though it. This is consistent with study done by Mohammad et al. (43.6%) and Zahrni et al. (51%) which showed high rate of NSTEMI among PCAD.(25,47) Further study in this group is warranted to address for other possible causes of CAD other than traditional ones.

In the evaluation of angiographic characteristics in this study, the involvement of single-vessel disease was predominantly higher and statistically significant among PCAD (76.7%p=0.013) compared 2-vessel disease and 3-vessel disease. This is consistent with a study done by Christus et al., in which one, two, and three-vessel CAD were seen in 32.5%, 19%, and 15% respectively among patients with PCAD (54). The rate of development of fat plaque in the vessel can be explained by an interplay of duration of time, comorbidities and genetic susceptibility.

5.2 Strength and Limitations

To our knowledge, this study describes for the first time the burden of Premature CAD in Tanzania. Although it was a single-center study, JKCI being the only cardiac institute in the country provides a representative pattern of PCAD in the country. Additionally, this study will contribute to the local database of non-communicable disease.

A few limitations of our study are, owing to the small number of patients with PCAD, conclusions regarding cause and effect cannot be made with certainty. Another limitation is the lack of similar locally conducted studies from which we can make reference and comparison. Another setback is the lack of incorporation of other non-traditional risk factors such as use of energy drinks, autoimmune diseases, Immunosuppressive diseases (HIV) and abusive drugs which also accounts for risk factors for early onset of coronary artery diseases.

CHAPTER SIX

6.0 CONCLUSION AND RECOMMENDATIONS

6.1 Conclusion

The study highlights the prevalence of premature CAD in the country (14.9), predominantly affecting men with low physical activity, obesity, and family history of heart disease. Controlling modifiable risk factors is crucial to reducing the incidence and impact of premature CAD.

6.2 Recommendations

We suggest conducting more local studies to enhance the available database for reference comparisons. Moreover a larger sample with variable of interest (premature CAD) is required to power the certainty of association. Additionally, exploring other risk factors like use of recreational drug, autoimmune diseases, use of energy drinks and anabolic steroids in relation to premature CAD is advised in future researches.

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APPENDICES

Annex 1. Informed consent-English version

Consent to participate in the study titled, "**Coronary artery disease in young adult patients undergoing coronary angiography at JKCI: prevalence and risk factors"**

Greetings:

I am Dr. Elifuraha Nicholao, a postgraduate student doing research titled, **"Coronary artery disease in young adult patients undergoing coronary angiography at JKCI: prevalence and risk factors**"

Purpose of the study:

To determine the prevalence and the associated risk factors among the young adults admitted at JKCI and scheduled for coronary angiogram.

What participation involves:

If you agree to participate in this study, your medical information will be used for research purpose-but will not be linked to you directly. This means your information will not bear identity, and this information will help us learn on the magnitude of premature coronary artery disease but there is no financial benefits to you but through the research you will be able to know blood pressure, glycemic status, state of your coronary vessels and education on lifestyle.

Confidentiality:

All information collected will be processed in a computer with identification numbers only, names and pictures will not be included.

Risk:

We expect no physical harm to happen to you during the course of this study.

Right to withdrawal:

Taking part in this study is completely voluntary and refusal to participate or withdrawal will not involve penalty or loss of any benefits to which you are entitled.

Benefits:

The results from this study will be used as evidence based information for proposing routine medical checkup of the young adults for blood pressure, blood sugar and other modifiable risk factors screening and education so as to plan for appropriate measures to mitigate or delay the onset of overt premature coronary artery diseases and its complications.

This study has sought approval from proper and informed authorities.

Who to contact:

If you have any questions regarding this study, feel free to contact me, the investigator, Dr. Elifurha Nicholao, MUHAS, PO BOX 65001, Dar-es-salaam, Tanzania.

Mobile phone +255 629038744. E mail: akwiimax@gmail.com

If you have any questions concerning your right as a participant, you may contact Prof. Mohamed Janabi, supervisor of the study, MUHAS, PO Box 65000, Dar es salaam, Tanzania.

Mobile phone +255755495270. E mail:moddyyakubu@yahoo.com

Dr. Nahya Salim Masoud, Director of Research and Publication (DRC) of MUHAS,Contacts P. O. Box 65001, Dar es Salaam, Tanzania. Tel: +255 713 250 074, Fax:+255-022-2152489, Email: drp.muhas.ac.tz.

Participant agreement

I have read the consent form and understood. All my questions have been answered.

I agree to participate in this study voluntarily.

Signature: Participant/Relatives……...

Signature of investigator……

Date consent signed ……/……/…….

Annex 2. Informed consent - Swahili version

RIDHAA YA KUFANYA UTAFITI WA KISAYANSI

Ruhusa ya kushiriki utafiti kuhusu, magonjwa ya mishipa ya moyo katika umri mdogo tukiangazia ukubwa wa tatizo pamoja na visababishi hatarishi kwa wagonjwa wanaoudhuria clinic katika taasisi ya moyo ya Jakaya Kikwaete.

Ninafanya utafiti kuangalia, ukubwa wa tatizo katika jamii na mambo changizi miongoni mwa wagonjwa wenye umri chini ya miaka 45 kwa wanaume na chini ya miaka 55 kwa wanawake wanaouthururia cliniki katita taasisi ya moyo ya Jakaya Kikwete.

Dhumuni la utafiti huu:

Kujua ukubwa wa ugonjwa wa mishipa ya moyo katika umri mdogo miongoni mwa wagonjwa wenye matatizo ya mishipa ya damu wa wanahudhuria Taasisi ya moyo ya Jakaya Kikwete.

Ushiriki:

Kama unakubali kushiriki huu utafiti,taarifa zako za matibabu zitatumika kwenye utafiti huu peke yake. Ushiriki huu utakupa faida ya kujua hali ya shinikizo la damu,kiwango chako cha sukari mwilini pamoja na kiwango cha lehemu katika mwili wako lakini hakutokuwa na faida ya kifedha.

Usiri:

Taarifa zote za uchunguzi zitaingizwa kwenye kompyuta na nambari ya utambulisho; jina na picha halitanukuliwa.

Madhara:

Tunategemea kwamba hakuna madhara ya yoyote kimwili yatokanayo na utafiti huu.

Haki ya kujitoa kwenye utafiti:

Kushiriki katika utafiti huu ni hiari na kutokubali kushiriki au kujitoa hautaadhibiwa au kupoteza haki yako ya matibabu.

Kutokea kwa madhara:

Tunategemea kwamba hakuna madhara yoyote ya kimwili yatokanayo na utafiti huu. Hata hivyo kama madhara ya mwili yakitokea kutokana na utafiti huu utatibiwa kilingana na kanuni na taratibu za matibabu ya Tanzania.

Faida za kushiriki kwenye utafiti:

Kama utakubali kushiriki kwenye utafiti huu, faida utakazopata ni pamoja na kupimwa kisukari,shinikizo la damu,lehemu mwilini na mambo hatarishi yanayoweza kubadilishwa pamoja na elimu ya kudhibiti ili kudhibiti au kucheleweshe kuanza kwa matatizo ya moyo katika umri mdogo na athari zake.Tunatumaini kwamba taarifa zinazopatikana zitawanufaisha wengine pia.

Kwa mawasiliano zaidi:

Kama una maswali kuhusu utafiti huu uwe huru kuwasiliana na mtafiti, Dr. Elifuraha Nicholao,Chuo kikuu cha afya na tiba Muhimbili, P.O Box 65001,
Simu +255 620038744, barua pepe: akwiimax@gmail.com

Kama una swali kuhusu haki yako kama mshiriki wasiliana na Prof. Mohamed Janabi, msimamizi wa utafiti.

P.O Box 65001, simu +255755495270. E mail:moddyyakubu@yahoo.com

Dr. Nahya Salim Masoud, Director of Research and Publication (DRC) of MUHAS,Contacts P. O. Box 65001, Dar es Salaam, Tanzania. Tel: +255 713 250 074, Fax:+255-022-2152489, Email: drp.muhas.ac.tz.

Idhini ya mshiriki

Nimesoma maelezo na kuyaelewa vizuri.Maswali yangu yote yamejibiwa na nimekubali kushiriki kwenye utafiti huu kwa hiari yangu.

Sahihi ya mshiriki/ndugu……...

Sahihi ya mtafiti ……

Tarehe ……/……/…….

Annex 3; English version questionnaire

MUHIMBILI MUHIMBILI UNIVERSITY OF HEALTH AND ALLIED SCIENCES



A. Demographic information

Questionnaire No. .....

1. Health facility.....
2. Participant's initials.....
3. Date of enrolment.....
4. Date of Birth (AGE).....
5. Sex Male ☐ Female ☐
6. Physical address.....
7. **Education Level**
   i. Never studied
   ii. Completed primary level
   iii. Completed secondary
   iv. College/ University education
8. **Occupation……..** (Mention)
   i. Unemployed
   ii. Petty trader
   iii. Peasant/ small scale grazer
   iv. Civil servant
9. **Case report for family history of heart disease**
   i. Is there any history of sudden cardiac death in your family?

Yes ☐ o ☐ don't know ☐

B. Case report form on associated Factors

10. Have you ever been diagnosed with hypertension Yes ☐ ☐

*If No please skip 3 move to question 4.

*If yes, are you on any anti-hypertensive medications? Yes ☐ No ☐

11. Have you ever smoked in your life time? Yes ☐ No ☐

*If No please skip question 5 and 6 move to question 7

*If yes, for how long…….

*How many cigarettes per day? …… Pack years.....

12. Do you use alcohol? Yes ☐ No ☐

*If No please skip questions 8 and 9 and move to Table below.

*How much alcohol per week? …….

*For how many years? ……

13. Have you ever been diagnosed with diabetes? Yes ☐ No ☐

E. Table 1.level of physical activities

Physical activity	**Put √**	**Frequency per week**	**Hours spent**		**MET**
			Per day	**Per week**	
LIGHT INTENSITY ACTIVITIES:					**< 3**
Sleeping					0.9
Watching television					1.0
Writing, desk work, typing					1.8
Walking, Do you use 1 hr or more to walk 1km,					2.3
Walking, Do you use 1hr or more to walk 2.7km					2.9
MODERATE INTENSITY ACTIVITIES:					**3 to 6**
Bicycling, stationary, 50watts, very light effort					3.0
Walking 3.0mph (4.8km/h)					3.3
Home exercise, light or moderate effort, general					3.5
Walking 3.4 mph (5.5km/h)					3.6
Bicycling, < 10mph (16km/h), leisure, to work or for pleasure					4.0
Bicycling, stationary, 100watts, light effort					5.5
VIGOROUS INTENSITY ACTIVITIES:					**> 6**
Jogging, general					7.0
Push-ups, sit-ups, pill-ups, jumping jacks					8.0
Running jogging, in place					8.0
Rope jumping, football, Volleyball					10

14. What kind of physical activities you have been involved in the past one month**?**

i.Low intensity physical intensity **score <3** ☐
ii.Moderate intensity physical activity **scores 3-6** ☐
iii.Vigorous intensity physical activity **score >6** ☐

F. Case report on ECG presentation

15. ECG findings (fill appropriately)……

G. Case report on anthropometric measurements

16. Height ..... meters
17. Weight..... Kg
18. BMI..... Kg/m^2 (calculate)

H. Case report form on investigations

19. Blood glucose levels
*FBG..... mmol/l Normal ☐ High ☐ Low ☐
*RBG..... mmol/l Normal ☐ High ☐ Low ☐

20. Serum cholesterol levels
*Total cholesterol…….. …….
*LDL…….Triglycerides.....

I. CATH-LAB results

21. Number of vessels involved……
22. Type of vessels involved…….

J. Blood pressure measurement

23…….