ADDIS ABABA UNIVERSITY

COLLEGE OF HEALTH SCIENCES

SCHOOL OF NURSING AND MIDWIFERY

DEPARTMENT OF NURSING

MAGNITUDE OF MYOCARDIAL INFARCTION AND ASSOCIATED FACTORS AMONG ACUTE CORONARY SYNDROME PATIENTS ATTENDING AT SELECTED HOSPITALS IN ADDIS ABABA, ETHIOPIA: A RETROSPECTIVE STUDY.

BY: MERON FETENE (BSC NURSE)

A RESEARCH THESIS SUBMITTED TO ADDIS ABABA UNIVERSITY, COLLEGE OF HEALTH SCIENCES, SCHOOL OF NURSING AND MIDWIFERY FOR THE PARTIAL FULFILLMENT OF THE DEGREE OF MASTERS OF SCIENCE IN CARDIOVASCULAR NURSING

JUNE 2021

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APPROVAL SHEET

ADDIS ABABA UNIVERSITY COLLEGE HEALTH SCIENCE, SCHOOL OF NURSING AND MIDWIFERY DEPARTMENT OF NURSING

I, the undersigned MSc student, declare that I have submitted my original work on a title magnitude of myocardial infarction and associated factors among acute coronary syndrome patients attending at selected hospitals, Addis Ababa, Ethiopia: a retrospective study.

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This thesis by the title, Magnitude of myocardial infarction and associated factors among acute coronary syndrome patients attending at selected hospitals, Addis Ababa Ethiopia: a retrospective study, 2021 is accepted in its present form by the board of examiners as Satisfying thesis requirement for the degree of masters in cardiovascular nursing.

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STATEMENT OF DECLARATION

By my signature below, I declare and affirm that this thesis is my own work. I have followed all ethical principles of scholarship in the preparation, data collection, data analysis and Completion of this thesis. All scholarly matter that is included in the thesis has been given recognition through citation. I affirm that I have cited and referenced all sources used in this document. Every effort has been made to avoid plagiarism in the preparation of this thesis. This thesis is submitted in partial fulfillment of the requirement for a graduate degree from the Addis Ababa University at College of Health Sciences, school of nursing and midwifery department of nursing. The thesis is deposited in the Addis Ababa University Digital Library and is made available to local, national and international scientific community. I solemnly declare that this thesis has not been submitted to any other institution anywhere for the award of any academic degree, diploma or certificate. Brief quotations from this thesis may be used without special permission provided that accurate and complete acknowledgement of the source is made. Requests for permission for extended quotations from, or reproduction of, this thesis in whole or in part may be granted by the Head of the Department or all advisers of the theses when in his or her judgment the proposed use of the material is in the interest of scholarship and publication. In all other instances, however, permission must be obtained from the author of the thesis.

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LIST OF ABBREVIATIONS AND ACRONYMS

ACS: Acute Coronary Syndrome

AMI: Acute Myocardial Infarction

CAD: Coronary Artery Disease

CABG: Coronary Artery Bypass Graft

CVD: Cardiovascular Disease

ECG: Electrocardiogram

HDL: High Density Lipoprotein

IHD: Ischemic Heart Disease

LDL: Low Density Lipoprotein

MI**:** Myocardial Infarction

MICU: Medical Intensive Care Unit

NSTEMI: Non ST Segment Elevated Myocardial Infarction

PAR: Population Attributed Risk

PCI: Percutaneous Coronary Intervention

STEMI: ST Segment Elevated Myocardial Infarction

TASH: Tikur Anbessa Specialized Hospital

TC: Total Cholesterol

TG: Triglyceride

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SUMMARY

Magnitude of Myocardial Infarction and associated factors among Acute Coronary Syndrome patients attending at selected Hospitals, Addis Ababa Ethiopia: a retrospective study 2021

Meron Fetene

Background: Myocardial infarction (MI) is one of the most prevalent serious diseases globally, and its prevalence is increasing in Sub-Saharan Africa as risk factors for the disease rise. However, research on the magnitude and associated factors of MI in Sub-Saharan Africa, especially Ethiopia, is limited.

Objective: to assess the magnitude of myocardial infarction and associated factors among acute coronary syndrome (ACS) patients attending at selected hospitals from January 2018 – February 2021 G.C.

Methods and materials: institution based retrospective study design was conducted. All Patients with ACS was included in the study. Data was entered into Epi-info version (3.5.1) statistical software package then was exported to SPSS software package version 24 for further analysis and p-value less than 0.05 was considered as statistically significant.

Result: Among the total of 374 ACS patients, 338(90.4%) of them were MI. The patients' average age was 55.99 years old, +/- 12.98 years. Two hundred fifty nine (76.6%) of MI patients were between the ages of 18 and 65, while the majority of patients, 82.5%, were male. Out of the total of 338 MI patients, 74.0% of them were ST elevation MI. diabetes was prevalent risk factors in this study. Among the independent variables diabetes and systolic BP of patients (90-140 mmHg) and heart rate >100 b/min were significant association at multivariate analysis.

Conclusion: MI was identified in the vast majority of ACS patients. Diabetic mellitus, systolic BP (90-140 mmHg) and heart rate >100 b/min were significant association with MI.

Key words: myocardial infarction, ACS, risk factors, Ethiopia

1. INTRODUCTION

1.1 BACKGROUND OF THE STUDY

The most severe occlusion of a coronary artery causes an acute coronary syndrome (ACS). Depending on the location and severity of the stenosis, it might induce unstable angina or a myocardial infarction (MI). MI occurs when the heart tissue dies as a result of a lack of blood flow (1). Non–ST–segment elevation MI (NSTEMI) and ST–segment elevation MI (STEMI) are the two forms of MI. Elevation of the ST-segment diagnosis in the presence of positive cardiac biomarkers, such as troponin and ST segment elevation, whereas the presence of positive cardiac biomarkers, such as troponin without ST segment elevation, is the diagnosis of NSEMI (1).

According to the World Health Organization (WHO), the majority of deaths from cardiovascular disease (CVD) are caused by MI (2). Patients with acute coronary syndrome who have been diagnosed with MI are predisposed to the major cause of hospitalization and death globally (3, 4).

Although the prevalence of communicable diseases has declined in Sub-Saharan Africa in recent years, an epidemiologic shift has occurred recently due to lifestyle changes and an increase in the incidence of diabetes mellitus and hypertension. As a result, the disease burden in Sub-Saharan Africa has increased significantly (5).

According to a meta-analysis of institutional and community-based research conducted in Ethiopia between 2000 and 2018, the prevalence of CVD was 5% (6). Another case series analysis found that CVD accounted for 50% of medical intensive care unit (MICU) admissions, with acute myocardial infarction (AMI) accounting for 9.8% of admissions and 6.3% of deaths, respectively (7). This suggests that the number of MI cases is rising.

Hypertension, type 2 diabetes, abnormal lipid profiles, obesity, smoking, advanced age, male gender, family history of cardiovascular disease (first degree relative: male 45 years, female

55 years), previous MI, percutaneous coronary intervention (PCI), and coronary artery bypass graft (CABG) surgery are all common factors that can lead to MI (8).

1.2 STATEMENT OF THE PROBLEM

Myocardial infarction is one of the world's most common serious diseases, accounting for more than 15% of all deaths each year (4). In the United States, the general prevalence of MI is 3% among those over the age of 20, and the prevalence of MI is higher among males than women in all age groups, at 4.0 % and 2.3 %, respectively (9).

Some risk factors, such as age, gender, and family history of cardiovascular disease, cannot be changed, but the majority of risk is attributable to lifestyle and behavioural patterns, which can be modified, and these risk factors are common around the world and have significant health consequences; additionally, a small number of risks account for large contributions to global loss of health life (10, 11).

The prevalence of risk factors such as hypertension, diabetes, overweight and obesity, physical inactivity, increased tobacco use, and dyslipidaemia is increasing in Sub-Saharan Africa (12). In addition, the INTERHEART Africa study found that five risk factors (smoking, diabetes, hypertension, abdominal obesity, and dyslipidaemia) contributed to over 90% of the population attributable risk (PAR) for AMI in Sub-Saharan Africa (13).

According to Ethiopian studies, the incidence of MI has increased over time, going from 3.5 per 1000 admissions (N = 23) in a five-year assessment in 1989 to 8.8% (N = 203) of patients in the medical intensive care unit (MICU) from 1988 to 1997, according to a 2001 report (14, 15) and Uncontrolled hypertension and diabetes, both recognized risk factors for MI, are steadily increasing in Ethiopia (16, 17). However, data on the magnitude of myocardial infarction and associated risk factors in Ethiopia is limited.

In a resource-constrained country like Ethiopia, disease prevention is more vital than disease treatment once it has occurred. By taking this into account, research will be able to determine the magnitude of myocardial infarction and associated risk factors, which will aid in the development of preventative strategies and the reduction of related morbidity and death.

2. LITRATURE REVIEW

2.1 PREVALENCE OF MI

In the United Kingdom, there are age-related limitations. MI affects 0.06 % to 2.46 % aged 45 to 75 years old, accordingly (4). According to a study conducted in a German health interview and examination survey for adults, the prevalence of MI was 4.7% among those aged of 40 to 79 year, and the prevalence was higher at an advanced age, accounting for 10.2% among those aged of 70 to 79 year, and the prevalence was also higher in men than women, 7.0% and 2.5%, respectively (18).

Myocardial infarction, previously thought to be uncommon in Sub-Saharan Africans, is now becoming more common (12). In a prospective survey of Sub-Saharan Africans, the prevalence of ACS was 13.5% (19), and another prospective study on acute coronary syndrome in young Sub Saharan Africans under the age of 40 years was conducted in Dakar, Senegal, where the hospital prevalence was found to be 0.45 %, and STEMI was diagnosed in 85.7 % of patients and NSTEMI in 14.3 % (20).

Out of 1173 adults who participated in the cross-sectional multicenter research in Tunisia, 49.7% had ACS, with 74.2% having NSTEMI (21). The prevalence of ACS among diabetic individuals in Sudan has been estimated to be 5.44 % (22).A retrospective study in Nairobi, Kenya, found that 57 % of ACS admission patients had STEMI (23) and another retrospective study in a referral hospital in Sub-Saharan Africa found that 101 patients had STEMI and 93 had NSTEMI (24).

In a retrospective study conducted at Addis cardiac hospital in Addis Ababa, Ethiopia, it was discovered that ACS was the clinical diagnosis in 53.7% of patients, with 33.3% of those having STEMI (25), and another retrospective study conducted at Tikur Anbessa specialized hospital in Addis Ababa, Ethiopia, revealed that out of 124 ACS patients admitted over a three-year period 72.6% of patients had STEMI (26).

2.2. SOCIO DEMOGRAPHIC FACTORS

2.2.1 Age

A total of 10,126 patients with suspected ACS presented to emergency departments in the United States showed that the elderly had a higher rate of ACS than non-elder groups, accounting for 14.5% and 7.4%, respectively (27) and another study in the UK found that current smoking, family history, and three or more significant risk factors were all greater in the younger cohort, but diabetes mellitus was somewhat more common in the older patients (28).

The average age of the 230 ACS patients in a study done in a referral hospital in Sub-Saharan Africa was 60.5 years (24). In a retrospective study conducted in Ethiopia showed the most common age stratum was 50 to 59 years old (25).

2.2.2 Gender

Males are more likely to suffer from myocardial infarction. According to the INTERHEART case control study, the proportion of male cases was highest in countries with a younger age of presentation of acute myocardial infarction, such as South Asia and the Middle East, where 85% of cases were male, compared to 74% in western Europe, 68% in central and eastern Europe, and 70% in China (10). In terms of risk factors, a Canadian study found that diabetes, a family history of CAD, and hypertension were more common in women than in males (29).

In a study conducted in a referral hospital in Sub-Saharan Africa, most of them were males (81.7%). (24). According to a study conducted in South African Asian Indian population, young men were more likely to smoke than young women, and men's HDL levels were lower than women's (30). According to a study conducted in Dakar, Senegal, the prevalence of ACS in women was 2.32% out of 38.1% of ACS patients, and hypertension and diabetes were higher among them (31). A retrospective study conducted in Ethiopia, confirmed the high prevalence were male, accounting for 91 % of ACS patients (32), and another retrospective study revealed that 75.8% of ACS patients were males (26)

2.3 RISK FACTORS FOR MI

2.3.1 Smoking

Smoking is a significant risk factor for MI, with smokers having double the risk of infarction than nonsmokers (33). In a case-control study conducted in Spain, the contribution of smoking to ACS in HIV-positive patients was higher than the contributions of diabetes and hypertension, and it was at a higher rate in HIV positive patients than in HIV-negative patients (34).

In a cross-sectional study conducted in Sri Lanka, 55.8% of STEMI patients were smokers, indicating that there is a strong correlation between smoking and STEMI (35). According to a study conducted in Dakar, 40 % admitted to the hospital for MI treatment were smokers (36). In a study of young Sub-Saharan Africans, smoking was found to be the main risk factor for 52.4% of patients (20). According to a study conducted in Ethiopia, 14.5 % were either current smokers or had a history of cigarette smoking (26).

2.3.2 Hypertension

Hypertension, both systolic and diastolic BP, raises the chance of MI, and the higher the pressure, the higher the risk (37). It was more common in Japanese patients with ACS, accounting for 70% and 79% of men and women, respectively (38). In a cross-sectional study conducted in Sri Lanka, 51.8% of NSTEMI patients had hypertension, showing a significance connection between hypertension and NSTEMI (35).

In Sub-Saharan Africa, hypertension is a public health issue, particularly in urban areas (39). Different studies in Africa have come to the same conclusion. In a study conducted in Nepal, 64% of 100 ACS patients had hypertension (40). Another study in Sub-Saharan Africa discovered that hypertension was the most common risk factor, accounting for 46.8% of STEMI and 51.0% of NSTEMI patients, respectively (5).

In Ethiopia, a retrospective study at Tikur Anbessa specialized hospital (TASH), revealed that 61.3% of patients had a previous history of hypertension (26), and another retrospective study discovered that 61.2% had hypertension (25).

2.3.3 Diabetes

Diabetes increases the risk of MI by increasing the rate of atherosclerosis progression, increasing lipid levels, and facilitating the formation of atherosclerotic plaque (41). According to a study conducted in China, STEMI and NSTEMI patients had the highest prevalence of diabetes, accounting for 36.8% and 39.0%, respectively (42).

In research conducted in Nepal, 19% of the ACS patients were diabetic (40). Another study conducted in a Sub-Saharan African found diabetes to be the most common risk factor, accounting for 38.7% and 34.7% of STEMI and NSTEMI patients, respectively (5). According to a study conducted in an Ethiopian urban hospital, diabetes is the most common risk factor, accounting for 40% of patients (32). Another retrospective study showed that 21% of ACS patients had diabetes mellitus (26).

2.3.4 Dyslipidemia

Triglyceride levels that are too high and high density lipoprotein (HDL) levels that are too low are both risk factors for MI. The amount of non-fasting triglycerides appears to be a substantial and independent predictor of future AMI risk, especially when total cholesterol levels are also high (43). According to a study conducted in Istanbul, Turkey, total cholesterol, triglyceride/high density lipoprotein cholesterol (TG/HDL) ratio, and triglyceride levels were all higher in young MI patients (44).

Increased total cholesterol was found in 65 to 70% of all patients in a cohort study conducted in the South African Asian Indian population (30). Increased total cholesterol was the most common risk factor observed in 69 % of AMI patients in a study conducted in Tikur Anbessa teaching hospital in Ethiopia (15), and another study conducted revealed that 63 % of patients had dyslipidemia (25).

2.3.5 Family history of cardiovascular disease

Independent risk factors for AMI include a family history of cardiovascular disease. In a recent combined analysis of 12 cohort studies, people with a first-degree family with

cardiovascular disease had a combined relative risk of 1.6 for future occurrences, compared to people without an affected first-degree relative (45).

A study done in Canada showed patients with a family history of coronary artery disease (CAD) had a higher prevalence of dyslipidemia (64% vs 53 %) than patients without a family history and young women with a family history of CAD showed the highest risk, including hypertension (67 %), dyslipidemia (67 %), smoking (42 %), and diabetes (33 %) (29). According to a study conducted among the South African Asian Indian population, the most frequent familial vascular disease seen was CAD (30)

2.4 SUMMERY OF LITERATURE

Globally, the prevalence of MI is higher in men and older people, and risk factors associated with MI vary by age and gender, such as smoking, having a positive family history, and having three or more major risk factors are more common in young people, whereas diabetes is more common in the elderly. While smoking is more common in men, hypertension, having a family history of CVD, and diabetes are more common in women.

Patients with a family history of CAD had a higher prevalence of risk variables, which could contribute to an increased risk of MI. New MI diagnoses are on the rise in Sub-Saharan Africa, especially Ethiopia, and risk factors including as hypertension, diabetes, and dyslipidemia are becoming more widespread among Africans.

2.5 JUSTIFICATION OF THE STUDY

The mortality rate of this disease is increasing in Sub-Saharan Africa, especially Ethiopia, because of a lack of awareness about MI risk factors and a failure to follow preventive measures. The majority of current understanding of MI risk factors comes from studies conducted in developed populations. However, specific risk factors may predominate in certain locations, such as hypertension, which is the leading cause of MI in Africans, and it is unclear whether data from studies conducted in western countries can be applied to the Ethiopian setting. The researchers believe it is crucial to focus on studies on the magnitude and risk factors of MI, particularly in Ethiopia.

2.6 SIGNIFICANCE OF THE STUDY

Although myocardial infarction is not a curable disease, it can be prevented by lowering the risk factors linked with the condition. This is done by determining the severity of the MI and the factors that contribute to it. This study will determine the magnitude of myocardial infarction and associated factors, which will serve as a baseline for developing prevention strategies. It will also be used by health care providers to provide information to their patients and to improve service by providing evidence-based care. Because data on the extent of myocardial infarction and associated factors is inadequate, the current study presents an overview of myocardial infarction and associated factors.

2.7 CONCEPTUAL FRAMEWORK

Unhealthy habits such as smoking have been linked to metabolic/physiological alterations such as elevated blood pressure (hypertension), elevated blood sugar (diabetes), and elevated blood lipids. Furthermore, atherosclerosis is a long-term process that begins in childhood and manifests as a heart attack or a stroke (47). The study will examine myocardial infarction as dependent variable and hypertension, diabetes, dyslipidemia, age, gender, smoking, and family history of cardiovascular disease as independent variables.

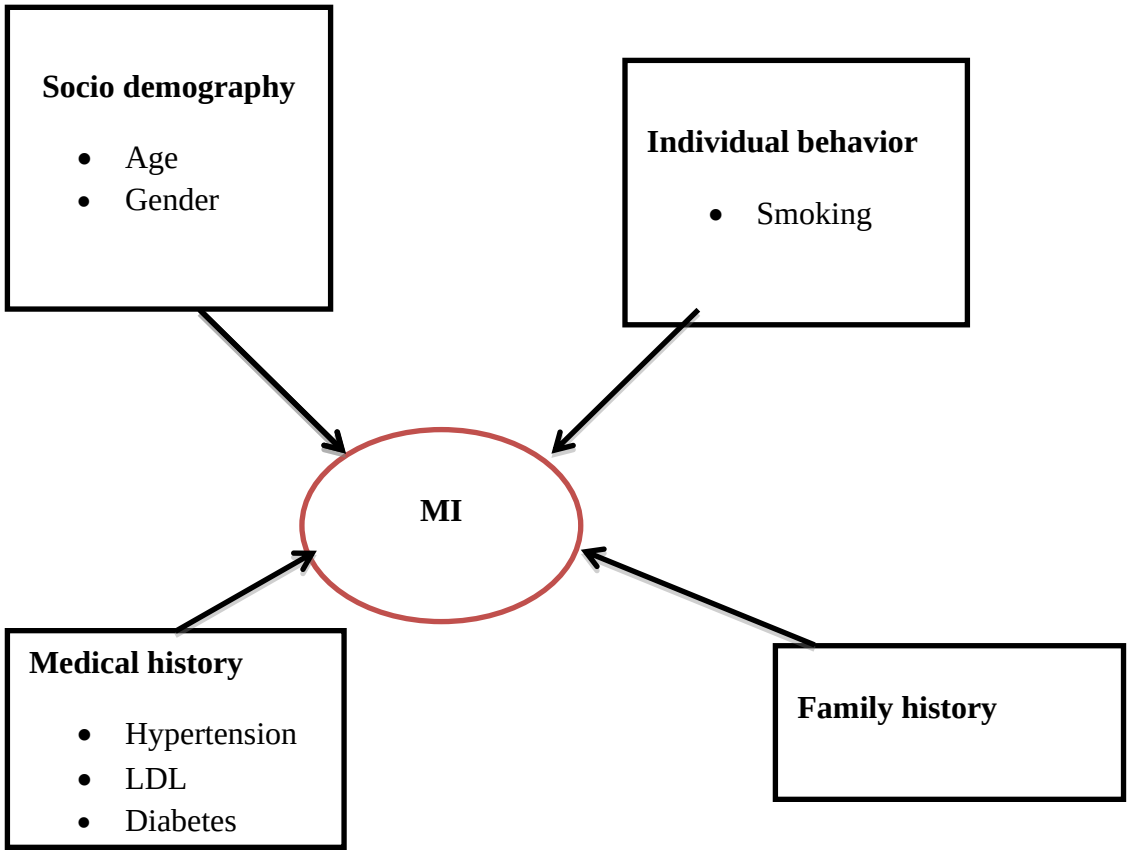

Figure 1.Conceptual frame work of magnitude and associated factors of MI developed by Principal investigator after literature review.

3. OBJECTIVES

3.1 GENERAL OBJECTIVE

To assess the magnitude of myocardial infarction and associated factors among acute coronary syndrome patients attending at Selected Hospitals, Addis Ababa Ethiopia: A Retrospective Study, from January 2018 –February 2021 G.C.

3.2 SPECIFIC OBJECTIVES

- ✓ To assess the magnitude of myocardial infarction among acute coronary syndrome patients attending at Selected Hospitals, Addis Ababa Ethiopia: A Retrospective Study, from January 2018 –February 2021 G.C.

- ✓ To determine the associated factors of MI patients among acute coronary syndrome patients who came at Selected Hospitals, Addis Ababa Ethiopia: A Retrospective Study, from January 2018 –February 2021 G.C.

4. METHODOLOGY

4.1 STUDY AREA AND PERIOD

The study was conducted at the Tikur Anbessa Specialized and Addis Cardiac Hospitals on patients with a diagnosis of ACS during the period January 1, 2018 to February 28, 2021 G.C. These hospitals were selected purposively due to high number of ACS patients served. TASH is a tertiary referral hospital that sees around 370,000-400,000 patients per year, although the exact number is not known. The hospital has a total of 800 beds (46). TASH is the cardiology center that provides sub specialty training and it is one of the government hospitals that provide percutaneous coronary intervention (PCI) service. Addis Cardiac Hospital services offered being a private hospital specialized in the field of cardiovascular disorders and the hospital performs most types of examination and treatments with in this field.

4.2 STUDY DESIGN

Institution based retrospective study design was conducted.

4.3 POPULATION

4.3.1 Source Population

The source population was all medical records of patients diagnosed with ACS who presented to Tikur Anbessa and Addis cardiac hospitals from January 2018 to February 2021 G.C.

4.3.2 Study Subject

Study Subject was consists of all medical records of patients diagnosed with MI who presented to Tikur Anbessa and Addis cardiac hospitals from January 2018 to February 2021 G.C.

4.4 ELIGIBILTY CRITERIA

4.4.1 Inclusion criterion

All patients with a final diagnosis of ACS

4.4.2 Exclusion criteria

- ACS patients whose medical records could not be accessed.
- ACS Patients whose medical records are incomplete.
- Ischemic heart disease patients

4.5 SAMPLE SIZE DETERMINATION

The sample size was determined using single population proportion formula. Since there is no literature available in Ethiopia 50% proportion will be considered and, 5% marginal error, 95% confidence interval and 10% non-response rate will be added.

$n_o = (Z\alpha/2)^2 P (1-p)/d^2$

n_o = the minimum required sample size

$Z\alpha/2$= normal standard distribution value corresponding to 95% confidence interval

p= single population proportion =50% (because there is no study conducted on this topic in Ethiopia.)

d= the margin of error (precision) =0.05

N = source population =1500

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

=384

Since the total population is less than 10,000 **c**orrection formula used and computed as follows:

nf = $\frac{no}{1+no/N}$

nf = $\frac{384}{1+384/1500}$

= **305**

10% non-available patients chart was considered

Calculated as follows:

$\frac{305}{1-10\%} = \frac{305}{1-0.1} = \frac{305}{0.9} = 338$

. So, the final sample size was: **338**

nf = **338**

4.6 SAMPLING TECHNIQUE

TASH and Addis Cardiac Hospitals were selected purposively from 8 Hospitals (TASH, St Paul Hospital, Addis Cardiac Hospital, Gesund, Alpha Cardiac Speciality clinic, Land Mark General Hospital, ICMC General Hospital and Tazma Medical and Surgical Center) in Addis Ababa those provides service for ACS patients and All patients chart was used to collect data from the source population (January 2018 – February 2021 G.C.).

4.7 OPERATIONAL DEFINITIONS

Acute coronary syndrome: The patient's charts who were documented as ST elevation MI, Non ST elevation MI and unstable angina (UA).

Myocardial infarction: The patient's charts who were documented as ST elevation MI and Non ST elevation MI.

Previous myocardial infarction: The patient's charts who were documented at least 1 previous MI before admission.

4.8 VARIABLES

4.8.1 Dependent variable

- ❖ Myocardial infarction

4.8.2 Independent variables

- ✧ Socio demographic variables (Age and Sex)
- ✧ Blood pressure and heart rate
- ✧ Risk Factor for myocardial infarction: family history of cardiovascular disease, history of smoking, history of hypertension, history of diabetes, and dyslipidemia.

4.9 DATA COLLECTION INSTRUMENT AND PROCEDURE

A structured checklist was adapted from reviews of different literatures. The log book was used to get the card numbers of ACS patients who were presented during the study period. After getting the card numbers, patient charts were retrieved from the record and documentation office. The checklist consists of IV parts. Part I: Socio-demographic factor contains 4 questions Part II: initial assessment and investigation contains 11 questioners part III: past medical history contains 6 questioners part IV: types of diagnosis contain 3 questioners. Data was collected by three nurses who received training for two days on how to collect the data.

4.10 DATA QUALITY CONTROL

To assure the quality of data, the following measures were undertaken. Pre-test was done of the checklists in 5% of patient's chart other than the selected years of the study. Training for data collectors was given. The appropriately designed data collection instrument was used. Every day the collected data was reviewed and checked for completeness and consistency of the response by the primary investigator and then necessary feedback was given how to proceed the next day.

4.11 DATA ANALYSIS AND INTERPRETATION

Data was entered into Epi-info version (3.5.1) statistical software package then was exported to SPSS software package version 24 for further analysis. Descriptive analysis was used to describe the Socio demographic data and the pattern of each independent variable. The strength of an association between dependent and independent variables and its significance was computed using odds ratio with 95% confidence interval and Bivariate Logistic regression analyses was carried out to assess the association between the dependent and independent variables and to identify candidate for multivariate analysis and p-value less than 0.05 is considered as statistically significant.

4.12 ETHICAL CONSIDERATIONS

Formal letter of ethical clearance and approval was obtained from Addis Ababa University Ethical Review Committee College of Health Sciences, School of Nursing and Midwifery department of Nursing. Official was submitted to respective hospitals. Then letter of permission was secured from administrative bodies of the area to communicate with relevant bodies at the hospital. Before data collection, permission was obtained from the out-patient directorate of Tikur Anbessa Specialized and Addis cardiac Hospitals. The names of patients were replaced with codes to avoid individual identifiers.

4.13 DISSEMINATION PLAN

The study findings will be presented to Addis Ababa University College of Health Sciences, School of Nursing and Midwifery, TASH, Addis Cardiac Hospital and different stakeholders including, Addis Ababa Health Bureau, sub city health offices, and other agencies who are working in hospital. Finally, efforts will be made to publish in national and international journal for dissemination worldwide and also be presented in different conferences.

4.14 LIMITATION OF THE STUDY

Since retrospective method was used certain data may be missed and patients chart was lost. Hence, study period was extended to February, 2021 to get adequate sample size. Since this study is a two centered study it may difficult to generalize for general population.

5. RESULTS

5.1 SOCIO-DEMOGRAPHIC CHARACTERISTICS

Between January 2018 and February 2021, 400 individuals with ACS were seen in Tikur Anbessa and Addis Cardiac hospitals, with 374 cases meeting the inclusion criteria and having their data examined in the study. Three hundred thirty eight (90.4%) of ACS patients were diagnosed with MI. The average age of patients was 55.99 +/- 12.98, with a range from 24 to 92 years. Two hundred eighty six (76.5%) patients were between the ages of 18 and 65, while the majority of patients were male, 311 (83.2%).

5.2 BASELINE AND CLINICAL CHARACTERISTICS OF ACS PATIENTS

As indicated in table 1, patients' systolic BP (90 to 140 mmHg) and diastolic BP (60 to 90 mmHg) were at a higher frequency during baseline assessments, 67.4% and 79.7%, respectively. The mean heart rate was 86.62 +/- 22.98, with a low of un-recordable and a high of 210. Furthermore, 348 patients (93.0%) had their random blood sugar (RBS) checked, with an average RBS of 166.38 +/- 84.33. In addition, for all MI patients, the Killip class was reported and Killip classes I and IV accounted for 58.9% and 4.4%, respectively.

When it came to the investigation, biomarkers of cardiac injury such as troponins and CKMB were tested in 337 (90.2%) and 29 (7.8%) of the patients, respectively. During their hospitalization, 274 (73.2%) patients had their serum lipid levels measured, with 27 (7.2%) having a high total cholesterol level (> 240 mg/dl), 31 (8.3%) having an LDL level greater than 160 mg/dl, 182 (48.7%) having a low amount of high density lipoprotein (40mg/dl), and 50 (13.4%) having a high amount of triglyceride level (In addition, echocardiography and cardiac catheterization were performed for 355 (94.0%) and 147 (39.3%) of patients, respectively, although stress testing was performed only for 6 (1.6%) of patients.

In terms of common risk factors, 189 (50.5%) of patients had hypertension, 159 (42.5%) had diabetes, 22 (6.25%) of patients were current smokers, 103 (27.5%) of patients had dyslipidemia, only 7 (1.9%) of patients had a family history of CVD, and 37 (9.9%) of patients had a previous history of MI.

Table 1: Baseline and clinical characteristics of Acute Coronary Syndrome patients attending at selected hospitals, Addis Ababa, Ethiopia: A Retrospective Study, 2021

Variables		Frequency	Percent
Gender	Male	311	83.2
	Female	63	16.8
Systolic BP	< 90	16	4.3
	90- 140	252	67.4
	>140	106	28.3
Age	18-65	286	76.5
	>65	88	23.5
Diastolic BP	<60	13	3.5
	60-90	298	79.7
	>90	63	16.8
Heart rate	< 60	23	6.1
	60-100	269	71.9
	>100	82	21.9
Total cholesterol	<200	190	50.8
	200-240	51	13.6
	>240	27	7.2
LDL cholesterol	<100	110	29.4
	100-129	72	19.3

	130-160	49	13.1
	>160	31	8.3
HDL cholesterol	> 60	13	3.5
	40-60	76	20.3
	<40	182	48.7
Triglycerides	<150	176	47.1
	150-200	46	12.3
	>200	50	13.4
Hypertension	Yes	189	50.5
	No	185	49.5
DM	Yes	159	42.5
	No	215	57.5
Smoking history	Never smoked	330	88.2
	Ex- smoker	22	5.9
	Current smoker	22	5.9
Dyslipidaemia	Yes	103	27.5
	No	271	72.5
Family	Yes	7	1.9

history of CVD	No	367	98.1
Previous history of MI	Yes	37	9.9
	No	337	90.1

5.3 TYPES OF DIAGNOSIS

This study examined 374 patients who had been diagnosed with ACS, the majority of them being diagnosed with MI (90.4%) and most MI patients were diagnosed with STEMI (74.0%). The age group of 18-65 years old has the highest percentage of STEMI and NSTEMI patients, accounting for 78.0% and 72.7%, respectively.

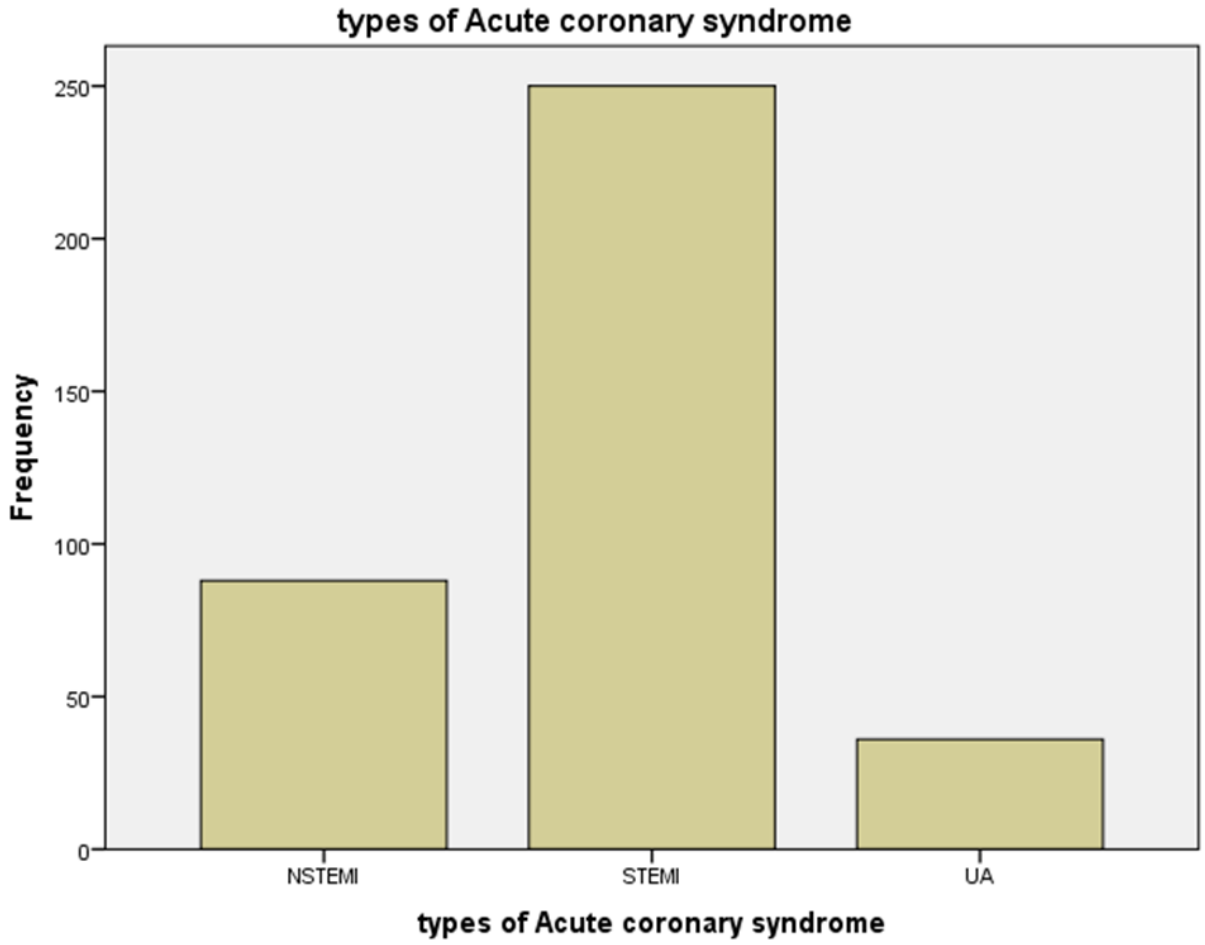

Figure 2: Class of diagnosis for Acute coronary syndrome patients attending at Selected Hospitals, Addis Ababa Ethiopia: A Retrospective Study, 2021G.C.

5.4 FACTORS ASSOCIATED WITH MI

5.4.1 Socio-demographic factors associated with MI

The majority of MI patients in this study were between the ages of 18 and 65 years, and about 82.5% of MI patients were male. This finding indicates that males and the age groups of 18 and 65 years are at a higher risk of MI.

5.4.2 Baseline/ clinical characteristics associated with MI

Among 338 MI patients, 150 (44.4%) patients had diabetes mellitus (DM), 165 (48.8%) had hypertension (HTN), 96 (28.4%) patients had dyslipidemia, 36 (10.7%) patients had a previous history of MI, 20 (6.25%) patients had a history of smoking with an average daily cigarette use of 15.32+/-5.826, and 7 (2.1%) patients had a family history of CVD.

Table 2:- Risk factors for MI patients attending at Selected Hospitals, Addis Ababa Ethiopia: A Retrospective Study, 2021

Variables		MI		COR	p value	AOR	p value
		Yes	No				
Gender	Male	279(82.5%)	32(88.9%)	1		1	
	Female	59(17.5%)	4(11.1%)	1.69(0.57-4.96)	0.339	1.69(0.57-4.95)	0.340
Age in year	18-65	259(76.6%)	27(75.0%)	1.09(0.49-2.42)	0.827	1.08(0.49-2.41)	0.837
	>65	79(23.4%)	9(25.0%)	1		1	
Hypertension	Yes	165(48.8%)	24(66.7%)	1		1	
	No	173(51.2%)	12(33.3%)	2.09(1.01-4.33)	0.045*	189(0.87-4.1)	0.104
How long(HTN)	< 2 years	61(37.0%)	7(29.2%)	1.00(0.31-3.18)	0.993	1.18(0.16-8.54)	0.869
	2-5 years	52(31.5%)	11(45.8%)	0.54(0.18-1.58)	0.265	1.44(0.18-11.35)	0.726
	>5 years	52(31.5%)	6(25.0%)	1		1	

Diabetic mellitus	Yes	150(44.4%)	9(25.0%)	2.39(1.09-5.24)	0.029*	3.18(1.40-7.22)	0.005**
	No	188(55.6%)	27(75.0%)	1		1	
How long(DM)	< 2 years	54(36.0%)	3(33.3%)	1		1	
	2-5 years	41(27.3%)	4(44.4%)	0.56(0.12-2.68)	0.477	0.64(0.09-4.44)	0.651
	>5 years	55(36.7 %)	2(22.2%)	1.52(0.24-9.50)	0.650	1.06(0.12-9.45)	0.956
Dyslipidemia	Yes	96(28.4%)	7(19.4%)	1.64(0.69-3.87)	0.257	1.34(0.23-7.88)	0.741
	No	242(71.6%)	29(80.6%)	1		1	
Smoking history	Never smoked	296(87.6%)	34(94.4%)	1		1	
	Ex-smoker	22(6.5%)	0(0.0%)	185561299.5(0.000)	0.998	122364624.6(0.000)	0.999
	Current smoker	20(5.9%)	2(5.6%)	1.14(0.25-5.12)	0.856	82175226.7(0.000)	0.999
Family history of	Yes	7(2.1%)	0(0.0%)	175701191.4(0.000)	0.999	0.934(0.000)	1.000

CVD	No	331(97.9%)	36(100.0%)	1		1	
Previous MI	Yes	36(10.7%)	1(2.8%)	4.17(0.55-31.37)	0.165	154426704.5(0.000)	0.999
	No	302(89.3%)	35(97.2%)	1		1	

* Statically significant at p-value <0.05

AOR = Adjusted odds ratio; COR = Crude odds ratio

The data was analyzed and tested to see if there was an association between the independent variables and the outcome variables (MI). Initially, bivariate analysis revealed among the independent variables diabetic mellitus, systolic BP of patients (90-140 mmHg) and patient history of hypertension had significant association (table 3).

Multivariate analysis showed diabetic mellitus, systolic BP of patients (90-140) and heart rate of patients > 100 b/min were significant associations with having MI, with a 0.006, 0.021 and 0.013 p-value, respectively. But no significant associations were found between MI and males (p = 0.339), age (p = 0.827), hypertension (HTN) (p = 0.091), dyslipidemia (p = 0.741), previous history of MI (p = 0.999), smoking history (p = 0.999), and family history of CVD (p = 1.000).

According to this analysis, diabetic mellitus is 3.32 times more likely to cause MI than non-diabetic mellitus, and patients with a systolic BP of 90-140 mmHg are 2.74 times more likely to have MI than patients with a systolic BP of 90 mmHg, and also Patients with a heart rate of 100 beats per minute are 9.73 times more likely to have an MI than those with a heart rate of 60-100 beats per minute.

Table 3:- Multivariate logistics regression analysis of independent factors association with MI among ACS patients attending at Selected Hospitals, Addis Ababa Ethiopia: A Retrospective Study, 2021.

Variables		**MI**		COR (95% CI)	P -value	AOR (95% CI)	P -value
		Yes	**No**				
hypertension	Yes	165(48.8%)	24(66.7%)	1		1	
	No	173(51.2%)	12(33.3%)	2.09(1.01-4.33)	0.045*	1.97(0.89-4.35)	0.091
Diabetes	Yes	150(44.4%)	9(25.0%)	2.39(1.09-5.24)	0.029*	3.32(1.42-7.79)	0.006**
	No	188(55.6%)	27(75.0%)	1		1	
Systolic BP	< 90mmHg	16(4.7%)	0(0.0%)	308573846.4(0.00)	0.998	125864670.4(0.000)	0.998
	90-140mmHg	233(68.9%)	19(52.8%)	2.34(1.16-4.71)	0.017*	2.74(1.16-6.44)	0.021*
	>140 mmHg	89(26.3%)	17(47.2%)	1		1	
Diastolic	<60 mmHg	13(3.8%)	0(0.0%)	304806574.1(0.000	0.999	122967658.2(0.000)	0.998

BP				)			
	60-90 mmHg	272(80.5 %)	26(72.2 %)	1.974(0.89-4.33)	0.090	1.14(0.45-2.88)	0.772
	>90 mmHg	53(15.7 %)	10(27.8 %)	1		1	
HR	< 60 b/min	20(5.9%)	3(8.5%)	1		1	
	60-100 b/min	239(70.7 %)	30(83.3 %)	1.19(0.33-4.26)	0.784	2.89(0.73-11.49)	0.131
	>100 b/min	79(23.4 %)	3(8.3%)	3.95(0.74-21.06)	0.108	9.73(1.60-58.90)	0.013*

* Statically significant at p-value <0.05

AOR = Adjusted odds ratio; COR = Crude odds ratio

6. DISCUSSION

The mean age of ACS patients at Tikur Anbessa and Addis cardiac hospital was 55.99+/-12.98 years, which is comparable to a study conducted in Nepal (mean age 60 years) (40) but lower than that of Sri Lanka (61.3 +/- 12.6 years) (35). The 18-65 year old age group had the highest risk of MI. This is consistent with a previous study that found a greater risk of MI in the 50-57 year age group (25). A study in Germany discovered a higher rate in the 70-79 year age group (18), and a similar finding in the United States discovered that elderly patients were more prevalent than non-elderly patients (27).

In this study, around 82.5 % of MI patients were male. Similar findings in Sub-Saharan Africa revealed that out of 230 patients, the majority were male (81.8%) (5), and in conformity with earlier research, 91% were male (32). This was also confirmed by a report in Germany. 7.0% were males (18).

Patients with a systolic blood pressure of 90-140 mmHg had a statistically significant association with MI ($p = 0.021$). This finding revealed that the majority of patients in this study had high systolic blood pressure for the first time and were unaware of it. As a result, untreated elevated systolic blood pressure is significantly associated with MI. Patients with heart rates greater than 100 beats per minute had a statistically significant association ($p = 0.013$).

Around 48.8% of patients had a history of hypertension. Similarly, in a Nepalese study, 64% of people had HTN (40). Hypertension was once again the most common risk factor in Sub-Saharan Africa, accounting for 60% of cases (5). However, according to the Sri Lanka study, 57 out of 187 MI patients had HTN (35).

Diabetes had a very strong association with MI ($p=0.006$) and it was discovered in 150 (44.4%) patients. The INTERHEART study found the same thing: a significant association between MI and diabetes ($p = 0.00001$) (10).In contrast, a study done in Sri Lanka found there was no association between MI and diabetes ($p=0.225$) (35). Research in Sub-Saharan Africa

has found that diabetes is the most common risk factor (5). This was also shown to be the most common risk factor in Ethiopia, accounting for 40% of cases (32).

Dyslipidemia was found in 28.4% of MI patients, which is lower than the 60-70% of all patients found in research in the South African Asian India population (30). However, according to research conducted in Sri Lanka, 44 out of 187 MI patients exhibited dyslipidemia (35).

In this study, 23 (6.8%) of the 338 patients were current smokers. This is lower than a study conducted in Dakar where 40% of patients were smokers (36), and also lower than a prior study, which revealed that 14.5% were current smokers (26). A family history of CVD was found in 7 (2.1%) of MI patients in this study, which was lower than in a study done in Sri Lanka, where 99 (33.0%) of MI patients had a history of ACS (35).

A previous history of MI was found in 36 (10.7%) of MI patients, which was similar to a previous study that found 36 (12%) patients had a previous history of MI (25), and also similar to a Sub Saharan African study that found 5.9% of STEMI patients and 28.7% of NSTEMI patients had a previous history of MI (5), but lower than in Sri Lanka, where 71 MI patients had a previous history of MI (35).

There were also no significant associations found between MI and males ($p = 0.339$), age ($p = 0.827$), hypertension ($p = 0.104$), dyslipidemia ($p = 0.741$), previous history of MI ($p = 0.999$), smoking history ($p = 0.999$), and family history of CVD ($p = 1.000$) in this study. In contrast, a study conducted in Sri Lanka excluded family history of CVD, and all of these variables were associated with MI (35).This is also supported by the INTERHEART study (10).

Taking into account the diagnosis, 338 (90.4%) of the ACS patients were diagnosed with MI. The majority of MI patients were STEMI, accounting for 250 (74.0%) of the total. Similarly, a retrospective study conducted at TASH, revealed that out of 124 ACS patients admitted over a three-year period, 88.7% had been diagnosed with MI and the majority were with STEMI (72.6%) (26). In a study conducted in Kenya, 83% of patients were diagnosed with MI, while 57% were diagnosed with STEMI (23).Nevertheless, according to a study conducted in Sri Lanka, the majority of ACS patients were diagnosed with unstable angina (37.7%) (35).

7. CONCLUSION AND RECOMMENDATION

MI was identified in the vast majority of ACS patients. Most of the MI patients in this study were males (82.5%). Diabetes, systolic blood pressure of patients (90-140 mmHg), and heart rate of patients > 100 b/min were associated with MI with p-values of 0.006, 0.021, and 0.013, respectively, and most of the MI patients were diagnosed with STEMI (74.0%).

Diabetes was a prevalent risk factor in this study, and it can be improved with varying cut-off target levels with MI, as well as easily reduced by adequate patient education and lifestyle adjustment. Because risk factors such as previous history of MI and family history of CVD are unchangeable. Lower cut-off goal levels may also help these patients.

Continuous education should be provided for the general public, particularly patients with MI diagnoses, in order to reduce the death rate of patients and encourage them to seek immediate medical attention if they develop MI symptoms. Finally, prospective, multi-centered studies with large sample sizes should be conducted to gain a comprehensive picture of the problem underlying the magnitude and associated factors of MI patients in Ethiopia.

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9. APPENDIX

Appendix I. ENGLISH VERSION QUESTIONNAIR

Checklist for the assessment of magnitude of myocardial infarction and associated factors among acute coronary syndrome patients

PART I: - socio demographic characteristics of patients

no	**variables**	**category**	**Skip**
101	Age	_____	
102	Sex	1. Male 2. Female	
103	Data of Admission	_____	
104	Date of discharge/death	_____	

Part II: - Initial assessment and investigation of patients from medical charts

No	**Variables**	**Category**	**skip**
201	Blood pressure	_____mm HG	
202	Heart rate	_____B/min	
203	Blood sugar	_____mg/dl	
204	killip class	_____	
205	Serum CK-MB measured	1. Yes, if yes peak	

		value_____ 2. No	
206	Serum troponins measured	1. Yes, if yes peak value_____ 2. No	
207	Serum creatinine measured	1. Yes, if yes peak value_____ 2. No	
208	Serum lipid measured during admission	Total cholesterol 1. Yes, if yes _____mg /dl 2. NO LDL cholesterol 1. Yes, if yes _____mg/ dl 2. No HDL cholesterol 1. Yes, if yes _____mg/ dl 2. No Triglyceride 1. Yes, if yes	

		_____mg/dl 2. No	
209	Echocardiogram performed	1. Yes 2. No	
210	Cardiac catheterization performed	1. Yes 2. No	
211	Stress test performed	1. Yes 2. No	

Part III: -Checklist for past medical history of patients

No	**variables**	**Category**	**skip**

301	Hypertension	1. Yes 2. No If yes, how long 1. <2 years 2. 2-5 years 3. >5 years	
302	History of diabetic mellitus	1 Yes 2 No if yes, how long 1. <2 years 2. 2-5 years 3. >5 years	
303	Dyslipidemia	1. Yes 2. No	
304	Smoking history	1. Never smoked 2. EX-smoker If yes, No. of years smoked___ 3. Current smoker If yes, average No of cigars per day__	
305	Family history of CVD	1. Yes 2. No	

306	Previous myocardial infarction	1. Yes 2. No	

Part IV:-Types of Diagnosis

no	**Variables**	**Category**	**Skip**
401	STEMI	If yes then max ST Elevation___	
402	NSTEMI	If yes then max ST Depression___	
403	Unstable angina (UA)		