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St. Paul's Hospital Millennium Medical College

SPHMMC

**MEDICATION ADHERENCE AND ASSOCIATED FACTORS AMONG
ISCHEMIC HEART DISEASE PATIENTS OF SAINT PETER
SPECIALIZED HOSPITAL CARDIAC CENTER ADDIS ABABA
ETHIOPIA 2019**

**A RESEARCH THESIS SUBMITTED TO THE DEPARTMENT OF INTERNAL
MEDICINE IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE
SPECIALTY CERTIFICATE IN INTERNAL MEDICINE**

EDEN NEGUSSIE (MD)

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CARDIAC CENTER ADDIS ABABA ETHIOPIA 2019**

BY: EDEN NEGUSSIE(MD)

ADVISORS: -

ESUBALEW WELDEYES (MD)

SAMSON ZEGEYE (MPH)

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ABSTRACT

Background: Ischemic heart disease is becoming a major health problem in sub Saharan Africa including Ethiopia, where there is already an overburdened health care system. The use of evidence-based medicines, after Ischemic heart disease is known to reduce adverse outcomes.

Objective: To assess medication adherence and associated factors among ischemic heart disease patients who are on follow-up at St. Peter specialized hospital cardiac center.

Method and Material: A cross – sectional study was conducted to assess medication adherence and associated factors among ischemic heart disease patients who are on follow-up at Saint Peter specialized hospital cardiac center. Data was collected by using structured questionnaires from April– July, 2019. Statistical analysis was done including calculation of frequencies and percentages for discrete variables, and means, standard deviations (SD), minimum and maximum values for continuous variables .Statistical test for significance was employed where appropriate at the level of significance of 5%.

Result: Among 208 patients during the study period, fifty five (35.9%) patients had a previous history of hypertension, 37(24.2%) patients had Diabetes, and 39(25.5%) patients have both. Regarding the type of ACS, STEMI accounts for 35.1%,NSTEMI for16.3%. Other forms of IHD accounts for 45.2%. The results showed that 94.7% of patients are receiving aspirin, 51.4% are on P2Y2 inhibitors, on 93.8% β -blockers, 91.3% of them are on ACE inhibitors, and 92.3% on statin. The combination of all 5 agents is provided to 44.2% of patients. The adherence level assessed with the ACDS score ranging from 16 to 32 points, with a median score of 27.08 ± 2.79 points., and the results showed 161 (77.4%) of them had high adherence score, 42(20.2%) for intermediate and 5(2.4%) patients for low score, respectively.

Conclusion: According to our results, there was good prescribing rates of secondary prevention medication for IHD and using ACDS score majority of our patients have high adherence.

Recommendation: we recommend having monitoring of adherence on IHD secondary prevention medications.

KEY WORDS: Ischemic heart disease, Adherence, ACDS score.

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ABBREVIATIONS

ACC – American College of Cardiology

ACDS – Adherence in Chronic Diseases Scale

ACS – Acute coronary syndrome

ACEI – Angiotensin converting enzyme inhibitor

AHA – American Heart Association

ARB – Angiotensin receptor blockers

BB – Beta-blocker

CCU – Coronary care unit

DALYs –Disability-adjusted life years

CPACS – Clinical Pathways for Acute Coronary Syndromes in China

ESC – European Society of Cardiology

GRACE – Global Registry of Acute Coronary events

HMG-CoA - 3-hydroxy-3-methylglutaryl coenzyme A

IHD – Ischemic heart disease

NSTEMI – Non-ST-elevation myocardial infarction

OECD – Organization for Economic Co-operation and Development

PCI – Percutaneous coronary intervention

STEMI – ST-elevation myocardial infarction

UA(P) – Unstable angina (pectoris)

USA – United States of America

WHO – World Health Organization

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CHAPTER ONE

INTRODUCTION

1:1BACKGROUND

Ischemic heart disease comprises a spectrum of diseases of the heart including acute coronary syndrome (ACS), which is the main cause of IHD deaths . Patients with ACS suffer from myocardial ischemia. There are three types of ACS: ST elevation (formerly Q wave) myocardial infarction (STEMI), non-ST elevation (formerly non-Q wave) myocardial infarction (NSTEMI) and unstable angina (UA).(1) These disorders are characterized by myocardial oxygen demand and supply mismatch, most often caused by atherosclerotic coronary artery disease.(2)

Cardiovascular disease is responsible for 10% of Disability-adjusted life years (DALYs) lost in low- and middle-income countries, and 18% in high income countries. Coronary heart disease burden is projected to rise from around 47 million DALYs globally in 1990 to 82 million DALYs in 2020. More than 60% of the global burden of coronary heart disease occurs in developing countries. (3)

Practice guidelines recommend that, unless a relevant contraindication exists, post-MI patients receive treatment with antiplatelet agents, such as aspirin or clopidogrel; beta-blockers; angiotensin antagonists, such as angiotensin-converting enzyme inhibitors (ACEI) or angiotensin receptor blockers (ARB); and lipid-lowering statins. Taken in combination, these drugs have been estimated to reduce the relative risk of CHD mortality by 80% as compared with placebo. (4)

According to the 2003 World health Organization (WHO) adherence project, adherence to long-term therapy for chronic illnesses in developed countries averages 50%. In developing countries, the rates are even lower. (5)

Poor adherence to long-term therapies severely compromises the effectiveness of treatment making this a critical issue in population health both from the perspective of quality of life and of health economics. Interventions aimed at improving adherence would provide a significant positive return on investment through primary prevention (of risk factors) and secondary prevention of adverse health outcomes.(6)

Moreover, the rise of performance measures that reward quality based on the attainment of treatment targets such as blood pressure and low-density lipoprotein (LDL) levels or outcomes such as 1-year mortality after hospitalization for conditions like acute myocardial infarction reinforces the import of longitudinal medication adherence.(7)

1:2 STATEMENT OF THE PROBLEM

The latest guidelines for ACS recommend the combined drug regimen, comprising aspirin, P2Y₁₂ inhibitor, angiotensin-converting enzyme inhibitor or angiotensin II receptor blocker, β -blocker, and statin, at discharge after ACS treatment to reduce recurrent ischemic cardiovascular events.(8)According to Mukherjee D.*et al* study combination evidence-based medical therapy was independently and strongly associated with lower 6-month mortality in patients with ACS, there was a 72% to 87% reduction in mortality in these individuals. (2)

Approximately one-third of patients who have had a myocardial infarction do not adhere to prescribed medication regimens. Non adherence is associated with increased risk of all-cause and cardiovascular mortality.(9)

In the chronic coronary artery disease setting, non-adherence to cardioprotective medications was associated with a 10% to 40% relative increase in risk of cardiovascular hospitalizations and a 50% to 80% relative increase in risk of mortality.(7)

In Saint peter specialized hospital cardiac clinic practice, non-adherence was observed in some of our patients .There is no published data but according to our observation ,negative beliefs about medication, side effects, cost and unavailability of medication ,encountering a variable number of health care providers during visits, less informed about the disease and medication adherence importance and possible side effects, longer appointment gaps, were some of the factors for non-adherence .Little is known about medication adherence in our practice and doing this research will provide an input for a solution and for a country like Ethiopia, reducing morbidity and mortality through adequate secondary prevention would also be financially wise as it would reduce costs to the health care system.

CHAPTER TWO

SIGNIFICANCE OF THE STUDY

The aim of conducting this study is that ischemic heart disease (IHD) is becoming a major health problem in sub Saharan Africa including Ethiopia, where there is already an overburdened health care system.

The use of evidence-based medicines (aspirin, statin, ACE-inhibitor, beta blocker), in ischemic heart disease (IHD) is known to reduce adverse outcomes, yet it is difficult to attain these goals in patients after discharge.

The study is an attempt to determine the adherence to evidence-based therapy in patients with ischemic heart disease (IHD). Therefore, this study provides information which can be used as an input for further studies and future planning, increase awareness among policy-makers and health managers about the problem of poor rates of adherence and its health and economic consequences.

CHAPTER THREE

LITERATURE REVIEW

3.1. Burden of the disease

According to World Health Organization – Non-communicable Diseases (NCD) Country Profiles, In Ethiopia there was a total of 700,000 deaths in 2016, of these non-communicable diseases(NCDs) are estimated to account for 39% of all deaths, from which 16% of them are caused by cardiovascular diseases. (10)

No countrywide study has been done on CVD in Ethiopia. However, some hospital-based studies and a few community based researches have shown CVD as an important cause of morbidity and mortality. Studies done in the late 1960s and 1970s showed CVD to account for 4-13% of medical admissions to hospitals in Addis Ababa. During the period from September 1975 to August 1979, there were a total of 5667 patients admitted to the medical wards of the Black Lion Hospital, Addis Ababa, of whom 381 (6.7%) admissions were due to CVD. In a study which was done in Addis cardiac hospital, a diagnostic coronary angiography was done to 300 patients, with catheterization, 227 (75.7%) patients had evidence of CAD, of which, 92 (40.5%) patients had multivessel disease. (11)

According to the study done in Jimma town on 2008, Among the total of 781 newly registered cardiac patients, 94 (12.0%) of them were due to ischemic heart disease. (12)

A systemic review which is done in 2014 stated that a study among all age-groups for admissions in Medical Intensive Care Unit (MICU) in the capital city reported an 8.8% prevalence of hospitalization for acute myocardial infarction (AMI), and the second study from Oromia region reported 9.8%. (13) A data from an institution based cross-sectional study showed that ischemic heart disease is the third most common cause for admission in the emergency room which is 15%. (14) A study which assessed trends in cardiovascular diseases, stated acute coronary syndrome accounted for 35.7% of all cardiovascular cases followed by heart failure and stroke. (15) In a study which done in 2014, to assess Outcome of patients with acute coronary syndrome admitted to Tikur Anbessa specialized hospital, the in-hospital mortality was reported to be high (27.4%). (16)

3.2. Importance of secondary prevention medication after acute coronary syndrome

Secondary prevention of CV events, including optimal medical therapy, other strategies for risk factor modification and lifestyle changes such as diet, exercise and smoking cessation, is of paramount importance because after an ACS episode, patients remain at high risk for recurrent ischemic events.(17)

Aspirin (or another oral antiplatelet drug) is protective in most types of patient at increased risk of occlusive vascular events, Overall, among these high risk patients, allocation to antiplatelet therapy reduced the combined outcome of any serious vascular event by about one quarter; non-fatal myocardial infarction was reduced by one third, on-fatal stroke by one quarter, and vascular mortality by one sixth.(18)

Compared with less intensive statin regimens, more intensive regimens further reduced LDL levels, and reduced the risk of myocardial infarction and stroke.(19) Beta-blockers are recommended, in the absence of contraindications, in patients with reduced systolic LV function (LVEF $\leq 40\%$).(20) Angiotensin converting enzyme inhibitors (ACEIs) have been shown to reduce 30-day mortality after ACS and confer long-term reduction in vascular events in patients with atherosclerosis. (17,21)

In a study at the University of Michigan Medical Center, where there were 1358 consecutive patients who were admitted to or discharged from inpatient services with a diagnosis of unstable angina or acute myocardial infarction, the use of combination therapy with aspirin, statins, BBs and ACEIs or angiotensin receptor blockers (ARBs) was independently and strongly associated with a 72% to 87% reduction in 6-month mortality.(2)

This and similar studies has led the European Society of Cardiology (ESC) and American College of Cardiology (ACC)/American Heart Association (AHA)guidelines to recommend that aspirin, statin, BB therapy and ACEI or ARB therapy should be initiated and continued indefinitely after acute coronary syndrome.(17,21)

3.3. Assessing medication adherence

There are many different methods for assessing adherence to medications. Osterberg et al categorized these methods as either direct or indirect. Direct methods include directly observed therapy, measurement of the level of medicine or metabolite in blood, and measurement of the biological marker in blood, and Indirect methods of adherence assessment include patient questionnaires, self-reports, pill counts, rate of prescription refills, assessment of the patient's clinical response, electronic medication monitors, measurement of physiological markers, and patient diaries. Electronic pharmacy data are becoming more widely available, and this is one of the more frequently used methods in the literature. (7)

The Morisky scale is a commonly used, validated; 4-item self-reported adherence measure that has been shown to be predictive of adherence to cardiovascular medications and blood pressure control.(22)

According to a study by Morisky DE. et al, which examined the psychometric properties and tested the concurrent and predictive validity of an 8-item structured, self-reported medication adherence measure in primarily low-income, minority patients with hypertension and the scale was reliable ($\alpha = .83$) and significantly associated with blood pressure control ($p < .05$). Using a cut point of <6 , the sensitivity of the measure to identify patients with poor blood pressure control was estimated to be 93%, and the specificity was 53%. The medication adherence measure proved to be reliable, with good concurrent and predictive validity and might function as a screening tool in outpatient settings with other patient groups. (22)

In another study which evaluated the level of adherence to treatment in patients after MI treated with percutaneous coronary intervention, using The ACDS score, which was developed by A Kubica and previously validated in patients with coronary artery disease (CAD), high adherence to treatment was observed in approximately 25% of patients 6-months after MI. (23)

Although each measure has its strengths and limitations, there is currently no general consensus as to the best measure to use to define adherence or persistence. (7)

3.4. Adherence to secondary prevention medication after acute coronary syndrome

There were no published studies looking specifically at the adherence to secondary prevention medication after ACS in Ethiopia, but other global studies were assessed.

A Study from USA which evaluated the rates of exposure to 3 evidence-based drug therapies after hospital discharge for patients with ACS, showed that exposure rates of 52% for ACE inhibitors or angiotensin II receptor blockers (ARBs), 64% for beta-blockers, and 63% for statins. (24) In a recent retrospective analysis of 20,976 AMI patients discharged alive after having AMI from Acute Coronary Treatment and Intervention Outcomes Network Registry–Get with the Guidelines hospitals in the USA, adherence rates at 90 days and 1 year after discharge for secondary prevention therapies were 68.7% and 61.1%. Respectively, for β -blockers, 63.8% and 54.4% for ACEIs or ARBs, 63.4% and 55.8% for statins, and 64.2% and 63.5% for platelet P2Y₁₂ inhibitors. (25)

A observational study in the Netherlands that enrolled 1000 patients with ACS, and found at discharge, 94% of patients received aspirin, 100% thienopyridines, 80 % angiotensin-converting enzyme inhibitors/angiotensin-II receptor blockers, 87 % β -blockers, 96 % statins, and 65 % the combination of all 5 agents. (26) Another systemic review from Netherlands showed adherence rates for pharmacological therapies at admission or at discharge ranged from less than 5.0% to more than 95.0%, whereas adherence rates for the performance of in-hospital CA ranged between 16.0% and 95.8%, and between 34.3% and 93.0% for risk stratification. (27)

A 2-year cohort study from Italy found that antiplatelets were characterized by the highest adherence (77%), followed by statins (73%), ACEI/ARBs (67%) and β -blockers (53%). (28) Another study from Spain a cohort consisting of 7,462 patients, PDC75 (proportion of days to cover 75%) was reached by 69.9% of patients taking antiplatelet agents, 43.3% taking beta-blockers, 45.4% taking angiotensin antagonists, and 58.8% taking statins. 92.8% of patients received an antiplatelet prescription post-discharge; 74.7% for beta-blockers; 77.2% for ACEI or ARB; and 87.1% received a prescription for statins. (4)

Clinical Pathways for Acute Coronary Syndromes in China (CPACS) is a prospective study and assessed adherence for evidence based therapies after ACS, and the results showed the use of drug therapy was high, above 90% for aspirin, 70% for β -blockers and angiotensin-converting enzyme inhibitors, 80% for statin at the time of hospital discharge but decreased during follow-up. And, fewer than half (48%) of patients were discharged on 4-drug combination therapy (antiplatelet, β -blocker, angiotensin-converting enzyme inhibitor/ angiotensin receptor blocker, and statin).(29)

One study from Korea showed that The regimen of aspirin + clopidogrel + β -blocker + angiotensin-converting enzyme inhibitor/angiotensin II receptor blocker + statin was prescribed to 75.71% patients with ACS at discharge. (30)A study from India, which Is a secondary analysis of the Kerala ACS Registry, it determined that optimal in-hospital and discharge medical care, defined as receiving aspirin, clopidogrel, beta blockade, statin, and heparin (in-hospital only), was delivered in 40% and 46% of admissions, respectively.(8)

From the Vietnamese Retrospective cross-sectional study, aspirin was prescribed for 97.9% at arrival and 96.3% at discharge; dual antiplatelet therapy was prescribed for 92.3% at arrival and 91.7% at discharge; loading doses were prescribed for 79.5% (aspirin) and 55.8% (clopidogrel); beta blockers were prescribed for 58.7% at arrival and 76.7% at discharge; angiotensin-converting enzyme inhibitors or angiotensin receptor blockers (ACEI/ARB) were prescribed for 89.1% at arrival or discharge; and statins were prescribed for 94.1% at arrival and 90.7% at discharge. (1)

A retrospective, multicenter, observational study from Lebanon showed Out of 200 included patients, the discharge note showed that 95.5% received aspirin, 89.5% thienopyridine inhibitors, 75.5% beta blockers, 61.0% angiotensin converting enzyme inhibitors or angiotensin receptor blockers, 82.5% statins, and 40.0% the combination of all 5 agents. (31)

When we see studies from Africa, a study from Kenya showed that aspirin (98%), clopidogrel (91%) and anticoagulants (73%) were given on presentation for patients with ST-elevation myocardial infarction.(32) The AFRICARDIO-2 conference on coronary artery disease in sub-Saharan Africa reviewed the ongoing features of ACS in 10 sub-Saharan countries, and the Senegal study showed drugs were used appropriately by 42%.(33)

A cross sectional analysis from south Africa showed that Prescribing of secondary prevention medications at discharge was found to be high (aspirin 94.5%, statins 95.7%, beta blockers 85.4%, ACEIs/ARBs 85.9%), and 70.7% of patients were discharged on a combination of all 4 drugs. At 6 to 9-month follow-up, the proportion of patients using these medications had reduced by 8.9% for aspirin, 10.1% for statins, 6.2% for beta-blockers and 17.9% for ACEIs/ARBs. Only 47.2% remained on all 4 drugs, a reduction of 23.5%.(34)

CHAPTER FOUR

OBJECTIVES

4.1. General Objective

To assess medication adherence and associated factors among ischemic heart disease (IHD) patients who are on follow-up at cardiac clinic of Saint peter specialized hospital cardiac center.

4.2. Specific Objective

- To describe clinical characteristics of patients with ischemic heart disease (IHD)
- To determine the magnitude of medication adherence in patients with ischemic heart disease (IHD)
- To assess factors associated with medication adherence in patients with ischemic heart disease (IHD)

CHAPTER FIVE

METHODS AND MATERIALS

5.1. Study area and period

St. Peter 's TB Specialized Hospital is a governmental Hospital under Federal Ministry of Health of Ethiopia and located in Addis Ababa. The hospital provides various services especially in Tuberculosis diagnosis and Treatment with admission capacity of 250.it also opened a first toxicology center in horn of Africa and also provides dialysis service. In 2017 in collaboration with Saint Paul's Hospital Millennium Medical College a cardiac center was inaugurated at Saint Peter's specialized hospital, where angiography and PCI services are given. The Hospital receive referrals from all over the country and it has outpatient specialty clinics where patients are referred for specific chronic disease for follow-up. The hospital is building its human and material capacity to become national center of excellence in the health sector.

The study was conducted from April to July, 2019 at the cardiology clinic Saint Peter's specialized hospital cardiac center.

5.2. Study design

A cross-sectional study design was used.

5.3. Population

5.3.1. Source Population

All ischemic heart disease (IHD) patients on outpatient follow-up at the cardiac clinic of Saint Peter's specialized hospital cardiac center.

5.3.2. Study Subjects

All ischemic heart disease (IHD) patients who came for follow-up at the cardiac clinic of Saint Peter's specialized hospital cardiac center during the study period.

5.4. Sample size and sampling technique

5.4.1. Sample size

Since there was no similar study done previously to assess medication adherence, the prevalence (p) will be taken to be 50%.

At a confidence level of 95% and a 5% level of statistical significance for accepting a chance of getting a finding that is not actually in the population, and the final sample size is calculated as follows:

$$n = \frac{(Z_{1-\alpha/2})^2 P(1-P)}{d^2}$$

Where n=minimum sample size required

p= prevalence (0.5)

d= margin of sampling error

$Z_{1-\alpha/2}$ =Value of z at 95% confidence interval level which is 1.96

$$\text{Hence } n = \frac{(1.96)^2 (0.5)(0.5)}{(0.05)^2}$$
$$n_0 = \underline{384}$$

Since the population is less than 10, 000, we use finite population correction

$$n_f = \frac{n_0 * N}{n_0 + N - 1}$$

Where n_f = corrected sample size

n_0 = minimum sample size

N= total population Therefore, $n_f = 384 * 520 / 384 + 520 - 1 = \underline{221}$

Finally, after considering a 10% non-response rate; $221 + 22 = \underline{243} \Rightarrow$ will be the final sample size.

5.4.2. Sampling Techniques

St Peter specialized hospital cardiac clinic were selected purposely. There are a total of 520 ischemic heart disease (IHD) patients on follow up in this selected hospital. Sampled patients who are on follow-up in the cardiac clinic in the study period are taken with systemic random sampling by taking every second respondent to respond to the questionnaire.

5.5. Data Collection

Instruments

A questionnaire was developed from different literature and used to explore the objectives of the study. Data was collected using Well-structured, easily understandable English language questionnaire in which the sixth part was translated to Amharic language. To establish the validity and reliability of ACDS score, the questionnaire was translated into Amharic language by a professional and it was piloted on 5% of the sampled size similar to the study subjects in Zewditu memorial hospital and showed no confusion. The questionnaire has six sections. Part one consists of socio-demographic characteristics of the patient and the second part includes clinical characteristics of the patient such as risk factors, medical history etc. part three has the laboratory data and the fourth and fifth part covers electrocardiography findings and the echocardiography characteristics respectively. Part Six of the questionnaire will be the Adherence in Chronic Diseases Scale (ACDS) which is validated for assessing adherence. This score was used over the Morisky scale, because it was available for free and it was developed and validated after used on ischemic heart disease patients. (6)

Data collection procedure

Four Internal medicine Residents were selected and they were trained on the questionnaire before the data collection by the investigator. Bilingual Amharic and Oromifa speakers were recruited as data collectors to interview respondents who had difficulty of speaking Amharic. Interviewing was conducted when respondents come to the cardiac clinic. After in depth and clear discussion on the relevance and objective of the study, confidentiality of the information and their inviolable right not to participate, respondents were requested for their consent. The residents collected data from eligible consenting participants through face-to-face interviews in a language they understand. The residents were supervised by principal investigator.

5.6. Data Analysis

The collected data was cleaned and entered into a computer and it was analyzed using SPSS version 25.0. It was summarized using tables graphs and pi- charts. Adherence of therapy was assessed by using ACDS score and collected with face to face interview. Statistical analysis was done including calculation of frequencies and percentages for discrete variables, and means, standard deviations (SD), minimum and maximum values for continuous variables. Correlation was done using Pearson method and Chi-square test to evaluate the odds ratios (with a 95% confidence interval) of various risk factors associated with medication adherence. Statistical analysis was performed using the Statistical Package for Social Sciences software (SPSS) version 25.0 and two-tailed P-value less than 0.05 was considered.

5.7. Quality Control

Data collectors were trained on data collecting process, Data was collected by using a pre-tested questionnaire in the cardiac clinic. Data was checked for completeness and consistency at the end of every day by principal investigator. The quality of data was further ascertained during the data entry and cleaning process.

5.8. Ethical consideration

Study respondents were briefed about the importance and significance of the study. Furthermore, they were informed that their information will be kept confidential. And verbal consent was obtained before the interviews.

A full explanation of the nature of the study was given to the respondent at the beginning of the interview. Each respondent was given the opportunity to give verbal informed consent, or withdraw from the interview if they so wish.

Anonymity was maintained by giving a code to the subject.

5.9. Variables

- Independent variables
 - Age
 - Sex
 - Marital status
 - Educational background
 - Income
 - Place of residence
 - Comorbidities
 - Type and number of medications
- Dependent variables
 - Adherence to therapy

5.10. Operational Definition/Standard definition

Adherence to a medication regimen is generally defined as the extent to which patients take medications, Aspirin, Thienopyridine Inhibitors, angiotensin -converting enzyme inhibitor or angiotensin II receptor blocker, Beta blockers, Statins as prescribed by their health care providers.

The ACDS (Adherence in chronic Diseases scale), was developed by A Kubica and previously validated in patients with coronary artery disease (CAD). The questionnaire consists of seven questions with five variants of responses to each question (Scoring: A=4, B=3, C=2, D=1, E=0). The total score in the ACDS (Adherence Scale in Chronic Diseases) ranges from 0 to 28 points. Three levels of adherence are considered.(6) (ANNEX 2 : Questionnaires)

Adherence	ACDS Score
High Adherence	>26
Medium Adherence	21-25
Low Adherence	<20

Myocardial ischaemia: in a clinical setting can usually be identified from the patient's history and from the ECG. Possible ischaemic symptoms include various combinations of chest, upper extremity, mandibular or epigastric discomfort (with exertion or at rest) or an ischaemic equivalent such as dyspnoea or fatigue.

NSTEMI: is a clinical syndrome defined by characteristic symptoms of myocardial ischemia, without ST elevation on electrocardiography (ECG) and elevated biomarker values of myocardial necrosis.

STEMI: is a clinical syndrome defined by characteristic symptoms of myocardial ischemia in association with persistent electrocardiographic (ECG) ST elevation and subsequent release of biomarkers of myocardial necrosis.

Unstable angina: is defined as myocardial ischemia at rest or minimal exertion in the absence of cardiomyocyte necrosis.

Ischemic cardiomyopathy: Patients with IHD and present with cardiomegaly and heart failure secondary to ischemic damage of the left ventricular myocardium that may have caused no symptoms before the development of heart failure.

Diagnosis for acute MI: Detection of a rise and/or fall of cardiac biomarker values [preferably cardiac troponin (cTn)] with at least one value above the 99th percentile upper reference limit (URL) and with at least one of the following:

- Symptoms of ischemia
- New or presumed new significant ST-segment–T wave (ST–T) changes or new left bundle branch block (LBBB).
- Development of pathological Q waves in the ECG
- Imaging evidence of new loss of viable myocardium or new regional wall motion abnormality
- Identification of an intracoronary thrombus by angiography or autopsy

Prior MI: If any one of the following criteria meets the diagnosis:

- Pathological Q waves with or without symptoms in the absence of non-ischemic causes.
- Imaging evidence of a region of loss of viable myocardium that is thinned and fails to contract, in the absence of a non-ischemic cause.
- Pathological findings of a prior MI

Smoking History:

- **Current smoker:** An adult who has smoked 100 cigarettes in his or her lifetime and who currently smokes cigarettes.
- **Every day smoker:** An adult who has smoked at least 100 cigarettes in his or her lifetime, and who now smokes every day. Previously called a “regular smoker”.
- **Former smoker:** An adult who has smoked at least 100 cigarettes in his or her lifetime but who had quit smoking at the time of interview.
- **Never smoker:** An adult who has never smoked, or who has smoked less than 100 cigarettes in his or her lifetime.

Family history of CAD: Any direct blood relatives (parents, siblings, and children) who have had any of the following at age less than 55 years (for first degree male relatives) and 65 years (for first degree female relatives): angina, MI, or sudden cardiac death without obvious cause.

Diabetes mellitus: defined as having a fasting blood sugar level of 125mg/dl and above and the diabetes mellitus patient must be on oral /injection (insulin) treatment

Hypertension: defined as having high blood pressure/hypertension if they either: (a) have a measurement of mean systolic blood pressure (SBP) ≥ 140 mm Hg or (b) mean diastolic blood pressure (DBP) ≥ 90 mm Hg or (c) report they are taking high blood pressure lowering medicine.

CHAPTER SIX

RESULTS

6.1. Socio-demographic characteristics

During the study period, a total of 208 patients with the diagnosis of ischemic heart disease were interviewed with the response rate of 85.5% this was because of shortage of time.

The mean age was 55.7 (SD $\pm$ 11.6) years ranging from 28 to 84 years. Sixty-six (31.7%) of the patients were female. Regarding their education status 123 (57.1%) of them are literate. One hundred fifty-nine (76.4%) of the patients are married. One hundred fifty-five of the patients (55.3%) were employed. An income data was collected from 185 patients and the median of monthly income in birr is 2000.0 birr. Hundred seventy-four (83.7%) of the patients are from the urban area.

Table 1, socio demographic characteristics of patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

Socio demographic characteristics		frequency	percentage
Sex	Male	142	68.3
	Female	66	31.7
Marital status	Single	10	4.8
	Married	159	76.4
	Divorced	8	3.8
	Separated	5	2.4
	Widowed	26	12.5
Educational level	No formal education	47	22.6
	Read and write only	38	18.3
	Literate	123	59.1
Occupation	unemployed	20	9.6
	Daily laborer	8	3.8
	Employed	77	37.0
	Farmer	9	4.3
	Merchant	21	10.1
	Retired	38	18.3
	House wife	35	16.8
Residence	Urban	174	83.7
	Semi urban	22	10.6
	Rural	12	5.8

6.2. Baseline Clinical characteristics

6.2.1. Risk factors

Regarding the conventional risk factors, 55 (35.9%) patients had history of hypertension, 37(24.2%) patients had DM, and 39(25.5%) patients have both Hypertension and DM. Ten(6.5%) patients had a history of dyslipidemia, as shown inTable 2

Table 2, Baseline clinical characteristics of patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

Risk factors	Frequency	Percent
Diabetes	37	24.2
Hypertension	55	35.9
Hyperlipidemia	10	6.5
Peripheral Arterial Disease	1	0.7
Chronic Kidney Disease	2	1.3
History of Stroke	1	0.7
Hypertension + Diabetes	39	25.5
Hypertension + Stroke	2	1.3
Diabetes+ Chronic Kidney Disease	2	1.3
Hypertension + Chronic Kidney Disease	1	0.7
Smoker+ Diabetes	1	0.7

6.2.2. Medical history

Regarding the type of ACS, STEMI accounts for 35.1%, NSTEMI for 16.3% and, UA accounts for 3.4%. Other forms of IHD accounts for 45.2%. Concerning the medical history, 37 (18%) of the patients have prior hospitalization for ACS and for 49 (23.8%) of them prior hospitalization and angiography was done, and 26 (12.6%) underwent PCI.

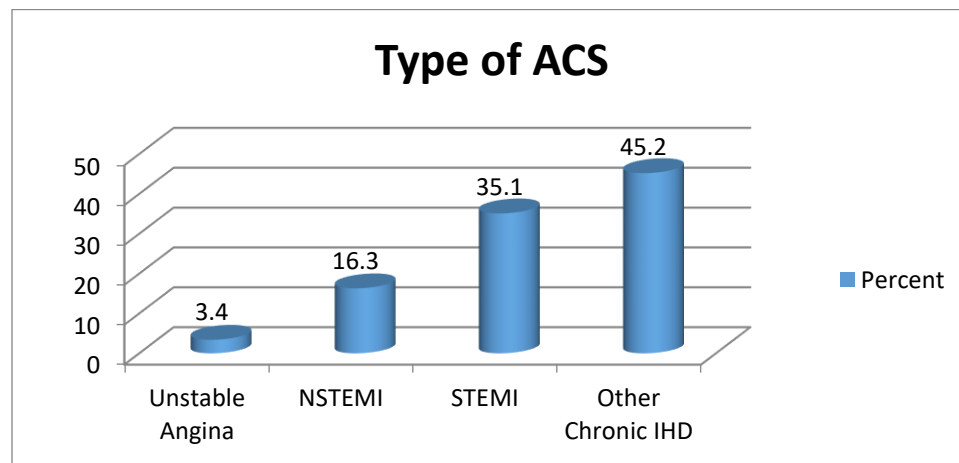


Figure 1,Type of ACS in patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

Table 3,Medical history of patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

Medical history	Frequency	Percent (%)
Prior Hospitalization of ACS	37	18.0
Prior MI	34	16.5
Prior PCI	26	12.6
Angiography	20	9.7
Prior Hospitalization for ACS + Angiography	49	23.8
Prior MI + Angiography	14	6.8
Prior Hospital+PCI	26	12.6

6.2.3. Current medications

The results showed that 197(94.7%) of patients are receiving aspirin ,107(51.4%) are P2Y2 inhibitors, (93.8%) β -blockers ,190(91.3%) of them angiotensin-converting enzyme inhibitors, and 192(92.3%) statin as shown on the graph below(Figure 2). The combination of all 5 agents is provided to 44.2% of patients.

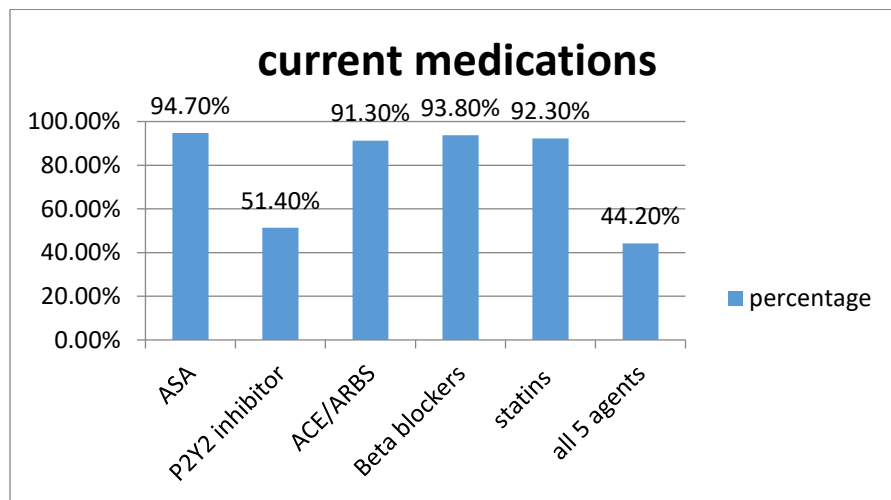


Figure 2, current medications of patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019No table of figures entries found.

6.3. Laboratory investigations

Complete blood count was measured in 195 patients, the mean WBC, hemoglobin and platelet is 8417.6 ± 3239.2 , 14.9 ± 2.09 , and 278979.5 ± 122625.2 respectively. Fasting serum glucose level was measured in 123 (59.1%) patients and 27(22%) of the patients have a fasting glucose level of $>180\text{mg/dl}$. The mean total cholesterol, LDL, HDL and triglyceride values were 169.1 ± 57.3 , 99.9 ± 40.7 , 41.8 ± 19.9 and 147.1 ± 75.6 respectively.

High level of total cholesterol (>200 mg/dl) was documented in 42(27.5%) patients whereas LDL level was more than 100 mg/dl in 41(43.2%) patients. Low amount of high-density lipoprotein was measured in 37(42%) of patients. About 51 (37.2%) of patients had high amount of triglyceride level which was higher than 150 mg/dl. Cardiac markers were measured in patients with ACS presentation and the mean of Troponin I is 12046.7 ± 26849.3 .

Table 4, Laboratory investigations of patients with ischemic heart disease saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

	N	Minimum	Maximum	Mean	Std. Deviation
CBC_WBC	195	1010.00	21700.00	8417.5795	3239.19590
CBC_Hemoglobin	195	7.20	19.80	14.9038	2.09364
CBC_Platelet	195	101000.00	961000.00	278979.4872	122625.23407
FBS	123	37	490	147.87	73.968
Lipid_Total	153	68.00	376.00	169.0892	57.33986
Lipid_LDL	106	12.00	227.00	99.9028	40.76036
Lipid_HDL	113	14.40	179.90	41.7873	19.19518
Lipid_Triglycerides	148	49.00	412.20	147.0824	75.56818
RFT_BUN	200	4.90	158.00	29.1654	17.99746
RFT_Creatinine	200	.27	6.20	0.9934	0.47978
Potassium	195	2.60	6.07	4.3004	0.52855
aPTT	94	9.50	97.30	34.9278	14.67475
INR	101	0.42	5.60	1.3900	0.59866
CKMB	61	0.96	6080.00	168.6967	776.50979
Troponin_T	7	12.49	39298.50	7675.7743	14155.84261
Troponin_I	124	0.0000	160000.0000	12046.676476	26849.2905921

6.4. Electrocardiography findings

ECG at initial presentation was taken and 196 patients had ECG, and the mean rate is 85.76 ± 18.02 , and for the QRS 99.44 ± 30.92 , T wave and ST segment is normal in 127(64.8%) and 86 (43.9%) respectively. There is T wave inversion in 29(14.8%) of patients and there is ST elevation in 11(5.6%) on inferior leads, abnormal Q wave is found in 57(29.2%) patients. there is AV block in 7(3.6%), out of 196 patients who had ECG one had sustained ventricular tachycardia and another patient had non sustained Ventricular tachycardia. from other ECG findings 12(5.8%) of them had LBBB and 3(1.4%) had RBBB. (Table 5)

6.5. Echocardiographic findings

Two hundred six (99%) patients had echocardiography. Out of these patients 41 (19.9%) had severe reduction in LVEF ($EF < 30\%$), and 77(37.4 %) had $LVEF > 50\%$. 166(66.5%) patients has a diastolic dysfunction. Hypokinesis is the most frequent wall motion abnormality seen which is 112(54.4%) followed by Akinesis 43(20.9%). Sixteen (7.8%) patients had LV mural thrombus and 6 (2.9%) patients had pericardial effusion. (Table 6)

Table 5, Electrocardiography findings of patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

		Frequency	Percentage%)	Mean	SD
Rate		196	94.2	85.76	18.02
Rhythm	Regular	190	96.9		
	Irregular	6	3.1		
QRS rate		196	94.2	99.44	30.92
T wave	Normal	127	64.8		
	Inverted in Leads II,III,aVF	29	14.8		
	Inverted in Leads V1 - V4	10	5.1		
	Inverted in Leads V1 - V6	21	10.7		
ST segment	Normal	86	43.9		
	Elevated in Leads II, III, aVf	11	5.6		
	Elevated in Leads V1 - V4	31	15.8		
	Elevated in Leads V1 - V6	39	19.9		
	Depressed in Leads II, III, aVf	7	3.6		
	Depressed in Leads V1 - V4	7	3.6		
	Depressed in Leads V1 - V6	15	7.7		
Abnormal Q wave	Yes	57	29.2		
AV block	Yes	7	3.6		
Non sustained V-tach	Yes	1	.5		
Sustained V-tach	Yes	1	.5		
Other ECG findings	LBBB	12	5.8		
	RBBB	3	1.4		

Table 6 Echocardiography findings of patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

		Frequency	Percentage(%)
Echo	Yes	206	99.0
Systolic dysfunction	>= 50 %	77	37.4
	40-50 %	41	19.9
	30-40 %	47	22.8
	<= 30 %	41	19.9
Diastolic dysfunction	Yes	137	66.5
Wall motion abnormality	No	47	22.8
	Hypokinesis	112	54.4
	Akinesis	43	20.9
	Dyskinesis	4	1.9
LV mural thrombus	Yes	16	7.8
Pericardial effusion	Yes	6	2.9

6.6. Assessing adherence using ACDS score

The adherence level assessed with the ACDS 6-months after hospital for MI ranging from 13 to 28 points, with a median score of 26 ± 2.49 points. The scores were classified as high (>26points), intermediate (21–25 points) and low (<21 points), and the results are 105 (50.5%), 94(45.2%) and 8(4.3%) patients, respectively. Our patients response according to the 7 questions of ACDS score were 90.4% of the patients always remember their medications,83.2% of them doesn't change their medication without consultation,91.3% of the patients strictly follow the prescribed dose, and 92.8% of them seek medical attention on appearance of side effects,73.6% of them find their medication to be beneficial and 30.3% of the patients were asked about drug related problems by their physicians and 28.4% of them were not asked. 97.6% of them tell the truth about medication related problems.

Table 7, Adherence level of patients with ischemic heart disease, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

Adherence	ACDS Score	Frequency	Percentage (%)
High Adherence	>26	105	50.5
Medium Adherence	21-25	94	45.2
Low Adherence	<20	9	4.3

Correlation of ACDS adherence score and all five agents with demographic variables were assessed, Pearson and Chi-square were used on this analysis. There is significant correlation between sex, marital status and having STEMI with taking all five agents but there is nosignificant correlation between the ACDS score and the demographic variables.

Table 8, .Correlation between ACDS adherence score and demographic variables, Saint Peter specialized hospital cardiac center Addis Ababa Ethiopia 2019

Variables	ACDS adherence score		All five agents	
	<i>p</i> -value	COR(95%CI)	<i>p</i> -value	COR(95%CI)
Sex	0.408	0.459-6.809	0.001	0.183-0.650
Age	0.978	0.196-4.873	0.436	0.464-1.392
Education	0.823	0.224-3.293	0.193	0.828-2.547
Marital status	0.923	0.186-4.600	0.030	0.237-0.930
Income	0.703	0.185-3.125	0.436	0.714-2.186
Hypertension	0.153	0.19-1.85	0.564	0.414-1.618
STEMI	0.910	0.224-3.797	0.0005	1.98-6.57
Chronic form of IHD	0.526	0.169-2.482	0.435	0.714-2.186

6.7. Discussion

Similar to other studies, patients with IHD in this study had a mean age above 55 years, were predominantly male and frequently had chronic comorbidities (hypertension, dyslipidemia and diabetes mellitus)(1,30,31)

According to this study, there were good prescribing rates of secondary prevention medication for ischemic heart disease.

When we compare these findings with the study from Spain, our prescribing rates are higher for all 5 drug classes. This is because this study is a single center study but their study was from different health care delivery areas and they showed some degree of variability in their performance on adherence measures.

When it is compared with a study from Netherlands, it is comparable for ASA and statins, but it is lower for thienopyridines, and higher for ACE/ARBs and β -blockers. The thienopyridines prescription rate is higher for Netherlands study because the data is collected from patients at early discharge but ours is lower because most of our patients have chronic form of IHD and most are on later follow-up time.

The other comparison is with Vietnamese study, the rate is comparable for Aspirin, clopidogrel and statins, but their study has lower prescribing rates for beta blockers and ACEI/ARBs, this is explained by adverse reactions of beta blockers in patients with co morbidities.

This study was comparable to a study from south Africa which showed that Prescribing of secondary prevention medications at discharge but their rate is lower during follow up which is explained by mostly due to drug side effects.

The use of combination of all 5 agents in this study is lower when it is compared to other studies.(25,26,29)

Concerning the ACDS score, when we compare this study results with the Poland study, the scores for adherence is higher for high adherence. These can be due to the patients were self-reporting the questionnaire in the Poland study, but in this study the patients were interviewed face to face so they may answer only the positive answers.

A lot of factors have been suggested to influence adherence, but this study has not shown any association with sociodemographic factors or health related factors.

The present study indicates that the individual use rates of these agents in IHD patients was encouraging, however the use of all 5 agents was provided to less than half of the patients, these may be attributed to chronic forms of IHD and the later follow up time.

6.8. Strength and limitation of the study

These data will provide information to evaluate medication adherence in IHD patients in Ethiopia. We will use these data as an input to improve of our hospital's quality of care. We also aim to explore reasons for successes, including high rates of adherence, which are comparable to high-income countries.

Since this study is a single-centered study in a hospital that routinely admit patients with ACS it may be difficult to generalize for the general population. It would therefore be useful to conduct additional studies including all hospitals from all-over Ethiopia.

Some of the patient's cards were difficult to obtain the necessary information, since some of the investigations were lost.

6.9. Conclusion

Our study has several implications for the clinical care of patients with IHD. Hypertension and diabetes are the most common risk factors identified, and one third of the patients presented with STEMI and had prior hospitalization of ACS. In general, physicians closely adhered to IHD guideline therapies in our hospital practice.

According to the ACDS scoring majority of our patients have high adherence score. Most of our patients are educated but there is no association between education level and adherence.

6.10. Recommendation

- Saint Peter specialized hospital
 - If possible, to have an electronic medical record system
 - Work on patient-Physician relationship since it has a role on adherence
 - Health workers should work together to create awareness about ACS and associated risk factors
 - Having monitoring of adherence on IHD secondary prevention medications
- Professional associations
 - They should work together to have our own registries for ACS patients like that of GRACE registry
- Federal ministry of health (FMOH)
 - It should provide cost sharing especially for higher priced agents and work with pharmaceutical companies on availability of the medications.
- Prospective, multi-centered studies on large sample size should be done to see the magnitude of adherence.

ANNEX

ANNEX I: References

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ANNEX 2 : Questionnaires

Consent form: Amharic Version

የጥናቱ ተሳታፊዎች የመረጃ እና ቃለመጠይቅ ለማድረግ የግለሰቦች ፍቃደኝነት መጠየቂያ ቅጽ

ስሜ ----- ይባላል፤ እኔ በቅዱስ ጳውሎስ ሆስፒታል ሚሊኒየም ሜዲካል ኮሌጅ (ቅ/ጳ/ሆ/ሚ/ሜ/ኮ) የጥናት ቡድን ጋር አብሬ እየሰራሁ ነው። ስምዎ በዚህ መጠይቅ ውስጥ የማይጠቀስ መሆኑንና በቃለ መጠይቁ የሚሰጡትን መረጃ ሁሉ በሚስጥር ተይዞ ለጥናት አገልግሎት ብቻ የሚውል መሆኑን ላረጋግጥልዎ እወዳለሁ። እርስዎ በዚህ ጥናት ላይ የመሳተፍ፣ ያለመሳተፍ ወይም በማንኛውም ወቅት ቃለ መጠይቁን የማቋረጥ ሙሉ መብት አለዎት። ነገር ግን እርስዎ በጥናቱ ተሳትፈው የሚሰጡትን መረጃ ጥናቱን ውጤታማ ለማድረግ ከፍተኛ ጠቀሜታ አለው።

በቅድሚያ በዚህ ጥናት እንዲሳተፉ ስንል በአክብሮት ጥያቄያችንን እያቀረብን በ ቅ/ጳ/ሆ/ሚ/ሜ/ኮ ሆስፒታል የልብ ህክምና ክትትል ክፍል ክትትል ላይ ያሉ ታካሚዎችን ያካትታል።

የጥናቱ ዓላማ፡ በዚህ በ ቅ/ጳ/ሆ/ሚ/ሜ/ኮ ሆስፒታል የልብ ህክምና ክትትል ክፍል ያሉ ታካሚዎችን ለልብ የደም ስር ህመም የሚወሰድ መድሀኒት አወሳሰድ እና ተያያዥ ምክንያቶች ለማጥናትና ለዚህ ሁኔታ ወሳኝ የሆኑ ነገሮችን በመለየት በተቋሙና በሀገር አቀፍ ደረጃ የሚሰጠውን የህክምና አገልግሎት ለማሻሻል እንድንወላው ማድረግ ነው።

የሚካሄድበት ጊዜ ይህ ጥናት ከሚያዚያ እስከ ሐምሌ ወር 2011 ዓ.ም ይካሄዳል።

የናሙናና የመረጃ አወሳሰድ ሂደት፡- ይህ ጥናት ከታካሚው ምንም አይነት ናሙናን አይጠቀምም የጥናቱን ተሳታፊዎች መረጃ በቃለ-መጠይቅ ይወስዳል።

ሊደርስ የሚችል አደጋ:- በዚህ ጥናት ውስጥ አደጋ የሚያደርስ ድርጊት የለም።

የሚገኝበት ጥቅም:- የዚህ ጥናት ውጤት ለጤና ባለሙያዎች፤ ለተቋሙና በሀገር አቀፍ ደረጃ የጤናውን አገልግሎት ለማሻሻል ድርሻ ላላቸው አካላት በጥናት ላይ የተመሰረተ ዘመናዊ የህክምና አገልግሎት ለማዳበር ከፍተኛ አስተዋጾ ይኖረዋል። ነገር ግን በጥናቱ ከመሳተፍ የሚገኝ ቀጥተኛ ጥቅም የለም

ሚስጥራዊነት:- የማንኛውም የጥናቱ ተሳታፊ መረጃ በሚስጥራዊነት ይያዛል። የእያንዳንዱን ግለሰብ መረጃ ከዋናው ተመራማሪና ከአማካሪዎቹ በስተቀር ማንም ሊያገኝ አይችልም።

ፈቃደኝነትን ስለማቋረጥ በዚህ ጥናት ውስጥ የመሳተፍ መብትም ሙሉ በሙሉ በፈቃደኝነት ላይ የተመሰረተ ነው። በጥናቱ ለመሳተፍ ፈቃደኛ መሆን ወይም ራስዎን ማግለል ይችላሉ። እንዲሁም በጥናቱ ባለመሳተፍ ምክንያት አሁን ወይንም ወደፊት በሚሰጠዎት የህክምና እርዳታ ላይ ተፅእኖ አይኖርም።

በጥናቱ ለመሳተፈ ፍቃደኛ ነዎት?

1. አዎ
2. አይደለሁም።

መልሱ አዎን ከሆነ፡ አመሰግናለሁ፡ ቃለ መጠይቁን ያካሂዱ ፤ መልሱ አይደለሁም ከሆነ ፡ አመሰግናለሁ ፤

ግለሰቡን በቃለ መጠይቁ ለማሳተፍ ምንም አይነት ማስገደጃ ወይም ጫና መደረግ የለበትም።

የጠያቂው ኮድ ----- ስም ----- ፊርማ -----

ቃለመጠይቁ የተካሄደበት ቀን ----- ወር ----- 2011 ዓ.ም

የተሟላ -1 ያልተሟላ -2 ሌላ ካለ ይግለጹ -----

ተጨማሪ መረጃ ከፈለጉ፡ የዋናው ተመራማሪ መረጃ፡

ስም፡ ዶ/ር ኤደን ንጉሴ

ስልክ ቁ፡ +2519079333/ 251988733566 E- mail address፡ nugeedye@yahoo.com

ክፍል6: Adherence in Chronic Diseases Scale (ACDS) መጠይቅ	
ተራ ቁ.	ጥያቄዎች
1	በሃኪሞች የታዘዘዎትን ሁሉንም መድሀኒቶች በሃኪም ትዕዛዝ መሰረት ሁልጊዜም እስታውሰው ይወስዳሉ ወይ ሀ)ሁሉንም ጊዜ ለ)ብዙውን ጊዜ ሐ)አልፎ አልፎ መ)ትንሹን ጊዜ ሠ)ምንም ጊዜ
2	ሀኪሞን ሳያማክሩ የመድሀኒት መጠንዎትን/አወሳሰድዎትን ይቀይራሉ ሀ)በጭራሽ ለ)ከተወሰኑ ሁኔታዎች ጋር በተያያዘ ሐ)አልፎ አልፎ መ)አብዛኛውን ጊዜ ሠ)የሀኪሜን ትዕዛዝ በጭራሽ አልከተልም
3	የመድሀኒት መጠንዎትን/አወሳሰድዎትን ይህንነት በሚሰማዎት ጊዜ ይቀይራሉ ሀ)በጭራሽ፤ ይህንነት ቢሰማኝም/ባይሰማኝም መድሀኒቱን በትዕዛዙ መሰረት እቀጥላለሁ ለ)አዎን፤ ይህንነት ሲሰማኝ የምወስዳቸውን መድሀኒቶች መጠን እቀንሳለሁ ሐ) አዎን፤ ይህንነት ሲሰማኝ በቀን ውስጥ መውሰድ ያለብኝን መጠን ሳልወስድ አልፋለሁ መ)አዎን፤ ይህንነት ሲሰማኝ ለተወሰነ ጊዜ መድሀኒቶቼን መውሰድ አቆማለሁ ሠ)አዎን፤ ይህንነት ሲሰማኝ ሁሉንም መድሀኒቶቼን አቆማለሁ
4	ከሚወስዱት መድሀኒት ጋር በተያያዘ የሚከሰቱ የጎንዮሽ ጉዳቶች ሲከሰቱ ምን ያደርጋሉ ሀ)ሀኪምና ለማግኘት ወደ ሀኪምና መስጫ እሄዳለሁ ለ)የምወስደውን የመድሀኒቱን መጠን ቀንሼ ከቀጠሮ ቀን በፊት ሃኪም ዘንድ ለመቅረብ እሞክራለሁ ሐ) መድሀኒቱን አቁሜ ከቀጠሮ ቀን በፊት ሃኪም ዘንድ ለመቅረብ እሞክራለሁ መ) መድሀኒቱን አቁሜ ቀጣዩን ቀጠሮ እጠብቃለሁ ሠ)ሁሉንም መድሀኒቶቼን አቁሜ ቀጣዩን ቀጠሮ እጠብቃለሁ
5	የሚወስዱዎቸው መድሀኒቶች ለጤናዎ አስፈላጊ ናቸው ብለው ያምናሉ ሀ)አዎን አምናለሁ ለ)አብዛኛዎቹ አስፈላጊ ናቸው ብዬ አምናለሁ ሐ) ጥቂቶቹ አስፈላጊ ናቸው ብዬ አምናለሁ መ)ጥቂቶቹ አስፈላጊ ናቸው ብዬ አምናለሁ፤ የተቀሩት ለጤናዬ ጠቃሚ አይደሉም ሠ)አብዛኛዎቹ የምወስዳቸው መድሀኒቶች ለጤናዬ ጠቃሚ አይደሉም
6	ለክትትል በሚመጡበት ወቅት ሀኪሞች ከሚወስዱት መድሀኒት ጋር በተያያዘ በእርሶ ላይ ስለተከሰቱ የጎንዮሽ ጉዳቶች ይጠይቅዎታል; ሀ)አዎን፤ ሁልጊዜ ለ)አዎን፤ አብዛኛውን ጊዜ ሐ)አዎን፤ አልፎ አልፎ መ)አዎን፤ የተወሰነ ጊዜ ሠ)በጭራሽ
7	ከመድሀኒትዎ ጋር በተያያዘ ሃኪሞች ለሚጠይቁት ጥያቄዎች እውነቱን ይናገራሉ; ሀ)ሀ)አዎን፤ ሁልጊዜ ለ)አዎን፤ ብዙውን ጊዜ ሐ)እውነቱን ለመናገር እሞክራለሁ፤ አንድ አንድ ጊዜ ግን ስለመድሀኒት አወሳሰድ ሲሆን ለመናገር ይከብደኛል መ)አንድ አንድ ጊዜ እናገራለሁ አንድ አንድ አልናገርም ሠ)አልናገርም

Consent form: English Version

1. Information Sheet for Study Subjects

My name is _____. I am working with the research team of SPHMMC. We would like to assure you that your name will not be mentioned in the questionnaire and the information that you will give us will be kept confidential and used only for research purpose. You have the full right to refuse to take part or to interrupt the interview at any time. But the information that you will give us is quite useful to achieve the objective of the study.

Purpose: the purpose of this study is to assess medication adherence and associated factors among ischemic heart disease patients, so as to further improve the services given in our institution in particular, and in the country in general.

Duration: the study will be conducted from April- July, 2019.

Procedures to be carried out: it only involves an interview for data collection using a standardized questionnaire by a trained interviewer. It does not involve any procedure to take a sample from the study participants.

Expected benefits: the findings of this research will be useful for the health personnel, stake holders, institutional and national policy makers involved in improving quality of health services based on evidence based practice. No reward will be provided for participating in this study.

Confidentiality: all your personal information will be kept confidential.

Termination of the study: participation in the study is absolutely voluntary, and refusal to participate involves no penalty or loss of benefits to which you are otherwise entitled. The study participants have a right to keep hold information, or decline to cooperate in the study and to refuse provision of data.

I would also like to inform you that this study will be approved by the Department of Internal medicine and IRB of SPHMMC. If you have any questions about the study, the name and contact information of the principal investigator (PI) is given below.

Name of PI: **Dr. Eden Negussie**

Tel: +251911079333/ +251988733566 **E- mail address:** nugeedye@yahoo.com

Part I: Socio-demographic characteristics		
1.	Age of the patient	_____
2.	Sex of the patient	1. Male 2. Female
3.	Level of education	1. No formal education 2. Read and write only 3. Literate, specify grade completed_____
4.	Marital status	1. Single 2. Married 3. Divorced 4. Separated 5. Widowed
5.	Occupation	1. Unemployed 2. Daily laborer 3. Employed 4. Farmer 5. Merchant 6. Student 7. Retired 8. Other specify-----
6.	Estimated monthly income in birr or if your income is from agriculture specify the types and its amount in quintal and bunch/bundle for khat	Per month_____ Per year_____
7.	Residence	1. urban 2. semi urban 3. rural

Part II: clinical characteristics	
Risk factors	1. BMI_____ 2. Diabetes 3. Hypertension 4. Hyperlipidemia 5. Current smoker 6. Family history 7. Peripheral arterial disease 8. Chronic kidney disease 9. History of stroke
Type of ACS	1. Unstable angina 2. NSTEMI 3. STEMI 4. Other chronic forms of Ischemic heart disease
Medical history	1. Prior hospitalization of ACS 2. Prior MI 3. Prior PCI 4. Family history of MI
Current medications	1. Aspirin 2. Thienopyridine Inhibitors 3. ACEIs/ARBs 4. Beta blockers 5. Statins 6. Combination of all 5 agent
Abbreviations: ACS: Acute Coronary Syndrome; UA: Unstable Angina; NSTEMI: Non-ST-segment Elevation Myocardial Infarction; STEMI: ST-segment Elevation Myocardial Infarction; ACEIs/ARBs: Angiotensin Converting Enzyme Inhibitors / Angiotensin Receptor Blockers; BBs: Beta Blockers; MI myocardial infarction;; PCI percutaneous coronary intervention	

Part III : laboratory investigations	
laboratory	Results
Full blood count	1. White blood cell _____/mm ³ 2. Hemoglobin _____ gm/dl 3. Platelet _____/ mm ³
Urine analysis	1. Normal 2. Proteinuria
Fasting blood glucose	_____mg/dl
Lipid profile	1. Total cholesterol _____mg/dl 2. LDL- cholesterol _____mg/dl 3. HDL- cholesterol _____mg/dl 4. Triglyceride _____mg/dl
Renal function test	1. BUN _____mg/dl 2. Creatinine _____mg/dl
Potassium	1. _____ meq/dl 2. not available
aPTT	1. _____ s 2. not available
INR	1. _____ 2. not available
CK-total	1. _____ U/L 2. not available
CK-MB	_____ng/ml
Troponin, qualitative	1. Positive 2. Negative
Troponin-T	1. _____ ng/ml 2. not available
Troponin-I	1. _____ ng/ml 2. not available

Part IV: Electrocardiography findings	
Rate	_____/min
Rhythm	1. Regular 2. Irregularly irregular
QRS duration	_____ms
T-wave	1. Normal 2. Inverted in lead _II, III ,AVF_____ 3. Hyper-acute in lead _____ 4. Flat in lead _____
ST-segment	1. Normal 2. Elevated in lead _II, III, AVF_____ 3. Depression in lead V2-4_____
Abnormal Q-wave	Lead ____III, AVF____
AV-block	1. Yes 2. No
Non-sustained ventricular tachycardia	1. Yes 2. No
Sustained ventricular tachycardia	1. Yes 2. No
Other important finding	_____ _____

Part V: Echocardiography functional and hemodynamic Data	
Does the patient have echocardiography evaluation?	1. Yes 2. No
Systolic dysfunction	1. $\geq 50\%$ 2. 40-50% 3. 30-40% 4. $\leq 30\%$
Diastolic dysfunction	1. Yes 2. No
Pulmonary arterial pressure	1. $\leq 30\text{mmHg}$ 2. 30-40mmHg 3. 41-60mmHg 4. $\geq 61\text{mmHg}$
Wall motion abnormality (WMA)	1. No 2. Hypokinesis 3. Akinesis 4. Dyskinesis 5. Aneurysm
Left Ventricular Mural thrombus	1. Yes 2. No
Pericardial effusion	1. Yes 2. No
Other important echo finding	_____

Part VI: Adherence in Chronic Diseases Scale (ACDS)	
No	Questions
1	Do you always remember to take all your medications according to your doctor's instructions? A. Always. B. Almost always. C. Sometimes. D. Hardly ever. E. Never.
2	Do you happen to change the dosing of your medications without prior consultation with your doctor? A. Never. B. Only occasionally. C. Sometimes. D. Frequently. E. I do not adhere to my doctor's recommendations at all.
3	Do you adjust the dosing of your medications according to how you feel? A. No, I strictly follow the prescribed dosing, no matter how I feel. B. Yes, I reduce the dosage of some medications when I feel good. C. Yes, I skip doses of some medications when I feel good. D. Yes, I temporarily discontinue some medications when I feel good. E. Yes, I discontinue all medications when I feel good.
4	On the appearance of medication-related side effects (e.g. stomach pain, liver pain, rash, lack of appetite, oedema): A. I seek medical attention instantly. B. I reduce the dosage of the medication and attempt to expedite the elective appointment with my doctor. C. I discontinue the medication and attempt to expedite the elective appointment with my doctor. D. I discontinue the medication and wait for the next elective appointment with my doctor. E. I discontinue all my medications and wait for the next elective appointment with my doctor.
5	Do you find all your medications necessary for your health? A. Yes, I do. B. I find most of my medications to be beneficial for my health. C. I find only some of my medications to be beneficial for my health. D. I find some of my medications to be beneficial for my health, while the others to be harmful for me. E. I find the majority of my long-term medications to be harmful for me.
6	Does your doctor inquire about medication-related problems that you might possibly experience? A. Yes, on every appointment. B. Yes, he/she usually does. C. Yes, but only sometimes. D. Yes, but only occasionally. E. No, never.
7	Do you tell truth when asked by your doctor about medication-related problems? A. Yes, always. B. Almost always. C. I try to be honest, but sometimes it is hard to admit to non-compliance with doctor's recommendations D. Sometimes yes, another time no. E. No, I don't. I find it my own private business.
Scoring: A=4, B=3, C=2, D=1, E=0	

Declaration

I the undersigned resident declare that this research project is my original work in partial fulfillment of the requirement for certificate of specialty in internal medicine. I also declare that it has never been presented in this or any other higher institution and all the resources and materials used in the research work have been duly acknowledged.

Name of resident: _____

Signature: _____

Date: _____

Approval of Advisors

This research work has been submitted for examination with my approval

Name of Public health advisor: _____

Signature: _____

Date: _____

Name of clinical advisor: _____

Signature: _____

Date: _____