# Clinical Features and Risk Factors of Acute Coronary Syndrome Among Elderly Patients in Sudan Heart Centre Hospital (2021-2022)

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# DEDICATION

In the praise of Allah, the lord of universe I dedicate my dissertation work to my family, A special feeling of gratitude to my loving parents, Mr. babiker ahmed elhag and Mrs. shadia batary whose words of encouragement and push for tenacity ring my ears. My brothers wail,waleed and basil have never left my side and always supported me.

I also dedicate this dissertation to all my friends who have supported me throughout and picked me up whenever life brought me down.

# DECLARATION

I, Muhab babiker ahmed elhag the undersigned, declare that the thesis is my original work and has not been presented for a degree at the University or any other university.

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| **Name of Examiner** | |
| **Signature of Examiner** | |
| **Date of Submission** | |

# ACKNOWELDGEMENT

# LIST OF ABBREVIATIONS

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| Abbreviations | | | |
| ACS --- | Acute coronary syndrome | ECG | --- Electrocardiogram |
| NSTE --- | Non st segment elevation | MI --- | Myocardial inflammation |
| CHF --- | Congestive heart failure | NRMI --- | National registry of myocardial infarction |
| STEMI | --- St elevation myocardial inflammation | | |
| HTN --- | Hypertension | CAD | --- Coronary artery disease |
| CKMB | --- Creatine kinase MB | AST | --- Aspartate aminotransferase |
| ACE --- | Angiotensin converting enzyme inhibitor | | |
| IHD --- | Ischemic heart disease | LV --- | Left ventricle |
| MR --- | Mitral regurgitation | AS --- | Aortic stenosis |
| AR --- Aortic regurgitation | | BMI | --- Body mass index |
| LFBBB --- Left bundle branch block | | | |
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# ABSTRACT

➢ **Background:-**

In the developed world, coronary heart disease is still the leading cause of death. Age is the single most important risk factor for coronary artery disease and an independent predictor of poor outcomes after an acute coronary syndrome. ACS refers to a group of conditions that are associated with acute myocardial ischemia and/or infarction due to varying degrees of reduction in coronary blood flow caused by plaque rupture/erosion and thrombosis formation or supply and demand mismatch.

➢ **Methods:-**

The study was done in a retrospective and cross-sectional design where patient's files fulfilling the inclusion criteria were reviewed. Data was collected and analyzed in a descriptive manner using SPSS version 23 and Microsoft excel and data was presented in the form of frequency charts and bar charts.

➢ **Results:-**

Data on 151 patients were gathered from the sudan heart center; the majority of them were men between the ages of 65 and 70, ( 71.6 )percent of them had no co-morbidities, whereas (28.4) percent did. Genetic factors , smoking, and diabetes are by far the most common risk factors in men, whereas hypertension was the most prevalent risk factor in women. Troponin seemed to to be the most elevated cardiac marker.

➢ **Conclusion:-**

Obesity, hypertension, and smoking appear to be risk factors for typical ACS symptoms in older or younger patients in this study. However, Men appeared to be more susceptible to having acute coronary syndrome in old age than women, the majority of them had symptoms of chest pain, and shortness of breath and diaphoresis, and were at risk due to hypertension, smoking.

➢ **Recommendations:-**

Several benefits and drawbacks were formulated throughout the conduction of this study. Chronic diseases, as well as age-related physiological and pathological features, can influence the presentation of ACS symptoms in the elderly. Understanding the factors associated with symptoms may aid in the early detection and better medical treatment of patients suffering from acute coronary syndrome.

Obtaining an accurate history of the patient with cardiac complaints is one of the most important tasks of clinical treatment and care providers. Identifying the symptoms of ACS is critical for effective and immediate treatment. The findings imply that individuals suspected of having heart ischemia disorders at emergency rooms should have their histories thoroughly examined.

# CHAPTER ONE
# INTRODUCTION

Acute coronary syndrome is a term used to describe a range of conditions associated with sudden, reduced blood flow to the heart.

One such condition is a heart attack (myocardial infarction) — when cell death results in damaged or destroyed heart tissue. Even when acute coronary syndrome causes no cell death, the reduced blood flow changes how your heart works and is a sign of a high risk of heart attack.so under the umbrella of acute coronary syndrome falls non-st segment elevation myocardial infarction , st- segment elevation myocardial infarction and unstable angina .The incidence of coronary artery disease increases with age in both sexes so it is more common in elderly patients.[1]

The term elderly usually refers to the age group ≥ 65 years, with distinction made in geriatrics among the ''young'' old (65–74 y), the ''older'' old (75–84 y), and the ''oldest'' old (≥85 years).2 However a more functional definition is needed to characterize the elderly. There exists a treatment-risk paradox while managing ACS in elderly patients as shown in recent trials.3,4 Elderly patients, who are at a high risk of morbidity and mortality from ACS, are being treated suboptimally because they fail the ''eye ball'' test. To overcome this paradox, a more objective method of risk stratification is needed in the elderly.5

The increased morbidity and mortality from ACS in the elderly is partly explained by the cardiovascular, pulmonary, and renal changes associated with aging. Occult comorbid renal dysfunction is often missed in the elderly, which probably accounts for many of the increased drug-related adverse events in this population.[2]

Another important contributor to increased mortality is the delay in presentation to the hospital due in part to atypical presentation of ACS. However, chest pain is still the most common symptom for elderly patients age>80years. Many elderly people also have markedly abnormal resting ECGs making the diagnosis of ACS more difficult. [3]

Age-related cardiovascular changes include decreased arterial compliance, increased cardiac afterload, and left ventricular diastolic dysfunction.33 Physical and cognitive functioning, comorbid diseases, and drug metabolism are also known to vary in older adults and may alter the course of ACS and response to therapies.34 In addition, an acute stress may alter these factors More than half of all trials for coronary disease in the past decade.

Failed to enroll any patient 75 years of age, with this subgroup accounting for just 9% of all patients enrolled in trials.16 Although explicit age exclusions in clinical trials have become less common since 1990, age-based exclusions continue.31 From the datasets provided in support of this document, we have found the median age of patients in NSTE ACS clinical trials to be 65 years (quartile range 56 to 72 years), whereas the median age of patients in NSTE ACS community populations is 68 years (quartile range 56 to 79 years). The initial cardiac evaluation begins with a determination that symptoms indicate the presence of an ACS. Atypical symptoms (defined as absence of chest pain) occur more often among elderly patients with NSTE ACS. In GRACE, the average age of patients.[4]

Presenting with atypical symptoms was 72.9 years, whereas the average age of patients presenting with typical symptoms was 65.8 years. In NRMI, only 40% of those 85 years of age had chest pain on presentation compared with 77% of those 65 years of age Although chest pain remains a common presentation of ACS regardless of age, elderly patients were more likely to present with dyspnea (49%), diaphoresis (26%), nausea and vomiting (24%), and syncope (19%) as a primary complaint; hence, MI may go unrecognized.42 Underscoring the presenting symptom of dyspnea, the likelihood of signs of CHF (pulmonary rales, jugular venous distention) also increases with age. Not surprisingly, just over half of the very elderly in the NRMI were admitted with an initial diagnosis of MI, rule-out MI, or unstable angina (56% of those 85 years of age), yet all of these patients were determined at discharge to have had an MI . In the Framingham cohort, silent or unrecognized infarctions were also more common in the elderly, which suggests that patients themselves fail to attribute atypical symptoms to a cardiac cause. Whereas silent or unrecognized infarctions accounted for 25% of all MIs,

They accounted for up to 60% of MIs in patients 85 years of age.42,43 ACS is more likely to develop in elderly patients who have another acute illness or worsening of a comorbid condition (eg, pneumonia, chronic obstructive pulmonary disease, a fall). These "sec- ondary" coronary events occur in the setting of increased myocardial.

Oxygen Demand Or Hemodynamic Stress In Pa- Tients With Underlying Atherosclerotic Disease. Thus, Nonspe- Cific Symptoms And Comorbid Diseases May Confuse The Initial Presentation And Contribute Totreatment Delays. Atypical Presentations have been. Shown to portend a worse prognosis (a 3-fold higher risk of in-hospital death [part because of delays in diagnosis and treatment and less use of evidence-based medications.42,43 Because of the high prevalence of atypical features and associated worse outcomes in the elderly, a high index of suspicion for ACS is advisable.[5]

Patients 75 years of age constitute 14% of the VIGOUR trials population but 28% of the GRACE and NRMI registry populations (Figure 1). Numerous differences are observed in baseline and presenting characteristics of STEMI patients in NRMI and those enrolled in the VIGOUR trials (Table 2). The ability to generalize expected outcomes observed from trials to the community setting is limited by differences between studied and treated populations.2,3 In addition to more elderly, a rightward shift in average age is occurring, with greater percentages aged 75 to 84 years (20.7% versus 12.2%) and 85 years of age (8.2% versus 1.5%). Commu- nity patients are more likely to have hypertension, prior stroke, acute heart failure, higher systolic blood pressure, and higher heart rate than are trial patients in every age group. In addition, left bundle-branch block is more common with age in both populations, and it accounts for more than a third of ECGs among patients 85 years of age in the community Although the absolute number of patients with STEMI increases with age, STEMI accounts for a smaller proportion of all ACS admissions in older subgroups (30% 75 years of age). 13% versus 4%, $P$0.001]).[6]

➤ *Statement of Research Problem*

Age is an important risk factor for developing acute coronary syndrome . Studies have shown this strong relation between the age and ACS especially in males .despite the world wide interest in the subject ,in sudan only limited amount of studies considered this topic and few amount of data exist with respect to the prevalence and causes of acute coronary syndrome so this study directed towards.

• ACS in Elderly Patients.

➤ *Justification*

Determination of clinical features of ACS is essentiall to reach the correct diagnosis, specially in the developing countries and under unfavorable conditions in which basic investigations may be unavailable. Consequently, identifying the clinical features and risk factors of ASC is the main stay of definitive treatment that will prevent misdiagnosis and enhance better clinical outcome and patient concern.

➤ *Research Question:*

What is the Clinical features and risk factors of acute coronary syndrome among elderly patients in sudan heart centre hospital?

➤ *Objectives:*

• *General Objectives :-*

To identify the Clinical features and risk factors of acute coronary syndrome among elderly patients in sudan heart centre hospital.

• *Specific Objectives :-*

✓ To determine demographic charactaristics of the study participants
✓ To determine the clinical features of patients presented with ACS
✓ To define the most common type of ACS among elderly
✓ To define the risk factors of ACS among the participants

# CHAPTER TWO
# LITERATURE REVIEW

In a parallel study performed by Rosengren A, Wallentin L, Simoons in 2006 named Age, clinical presentation, and outcome of acute coronary syndromes concluded that Age continues to be a strong predictor of increased hospital mortality in all types of ACS. The hospitalization of elderly patients with ACS is frequently complicated, particularly by heart failure.[7]

In another parallel study performed by Yadav P, Joseph D and Joshi P in 2006 named Clinical profile & risk factors in acute coronary syndrome concluded that There was indeed a significant male predominance, with a mean age of 56 years. Tobacco use was identified as a major risk factor (65%), while obesity (BMI greater than 25) was identified as the least common risk factor (13 percent ). Patients had typical chest pain (94%) and ECG revealed anterior wall changes in 54%. Complications occurred in 40% of patients, with arrhythmias being the most common (60%) and mechanical complications being the least common (2.5 percent ).[8]

Another parallel study conducted in 2004 by Perers E, Caidahl K, and Herlitz J, titled Spectrum of acute coronary syndromes: history and clinical presentation in relation to sex and age, found that women are more likely than men to develop ACS at a later age, are less likely to seek hospital care early, and are more likely to present with hypotension at a younger age. Depending on the kind of ACS, there is a pronounced variance in risk factors and prior history in both sexes.[9]

Another parallel study performed by Jalal Khaznadar AA, Salh RW in 2020 named Impact of Age on Risk Factors and Clinical Manifestations of Acute Coronary Syndrome concluded Acute coronary syndrome can be predicted by age, but it cannot be predicted by family history, hypertension, diabetes mellitus, obesity, smoking, physical inactivity, or dyslipidemia.[10]

Another parallel study performed by Reda AA, Mina MB and Hussein AN in 2009 named Pattern of risk factors and management strategies in patients with acute coronary syndrome. found that in comparison to other groups, the youngest patients were more likely to smoke, were primarily male, had a positive family history of early CAD, had a low BMI, and had a bad lipid profile. They experienced less of the other risk factors, such as diabetes, HTN, and low high-density lipoprotein levels. Age alone is thought to be a significant risk factor for CAD because the oldest patients had the lowest incidence of certain risk factors such DM, HTN, smoking, total cholesterol, low low-density lipoprotein levels, waist circumference, and BMI. Compared to male patients, female patients showed a higher frequency of HTN, dyslipidemia, high BMI, and an atherogenic lipid profile. In contrast, they had a lower incidence of DM, positive family history of premature CAD, and smoking.[11]

# CHAPTER THREE
# MATERIAL AND METHODS

➤ *Type of Study*
  This is a retrospective, cross sectional, facility- based study.

➤ *Study Population And Sample Size:*
  Total coverage of cases fulfilling the inclusion criteria were selected . The study will be conducted in Sudan heart center hospital.

➤ *Inclusion Criteria*
  Patients diagnosed with acute coronary syndrome

➤ *Data Collection:*
  Data will be collected via the use of a data collection sheet

➤ *Plan For Data Analysis:*
  The data collected will be computerized through Microsoft Excel. The data will be analysed through SPSS Version 23. The data will be summarized numerically (mean, standard deviation, median) and graphically (frequency tables, graphs.) Statistical analysis will be performed using Chi Square Tests to determine the association amongst categorical variables.

➤ *Ethical Consideration:*
  It will be sought from the research technical and ethical committee at the Faculty of medicine, informed consent from the dean of the faculty , informed consent from the hospital and Verbal consent from the patients will be seeked where their privacy and confidentiality will be maintained.

➤ *Plan of Investigation (How?):*
  The data collection sheet will be used to collect data on the cases, data will then be analysed using excel and SPSS version

➤ *Ethics*
  It will be sought from the research technical and ethical committee at the Faculty of medicine, informed consent from the administration of the hospitals. Verbal consent from the patients will be seeked where their privacy and confidentiality will be maintained.

# CHAPTER FOUR
# RESULTS

Data on 151 patients were gathered from the sudan heart center; the majority of them were men between the ages of 65 and 70, ( 71.6 )percent of them had no co-morbidities, whereas (28.4) percent did. Genetic factors , smoking, and diabetes are by far the most common risk factors in men, whereas hypertension was the most prevalent risk factor in women. Troponin seemed to to be the most elevated cardiac marker.
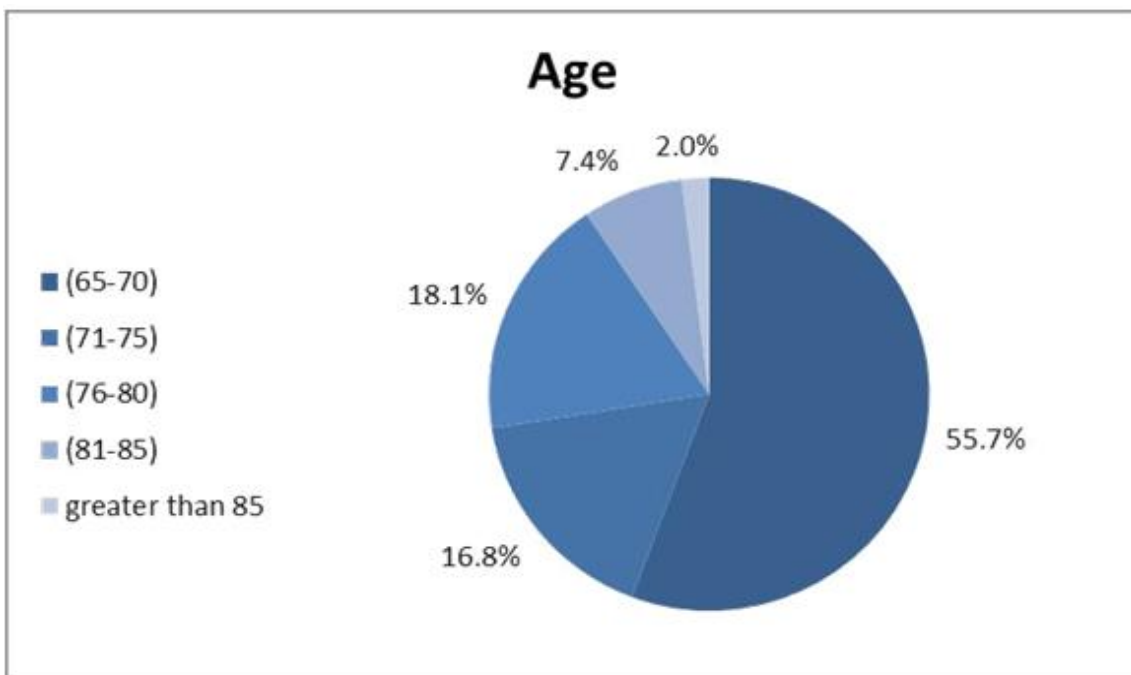


Chart 1 The Chart below Shows the Ages of the Patients
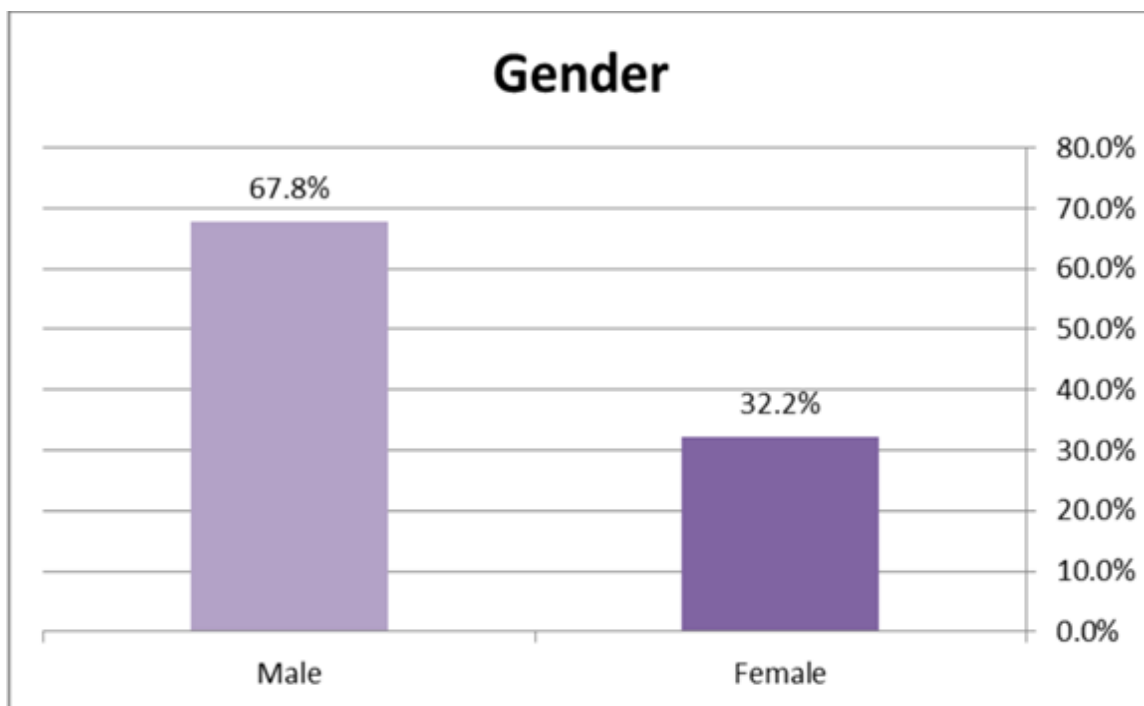


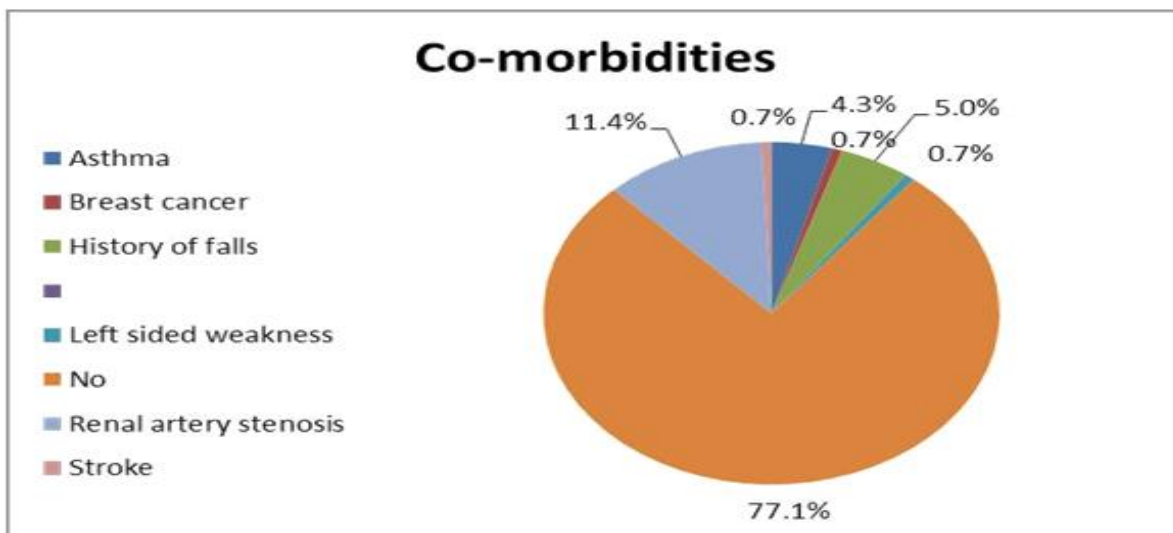Chart 2 The Chart below Shows the Genders of the Patients

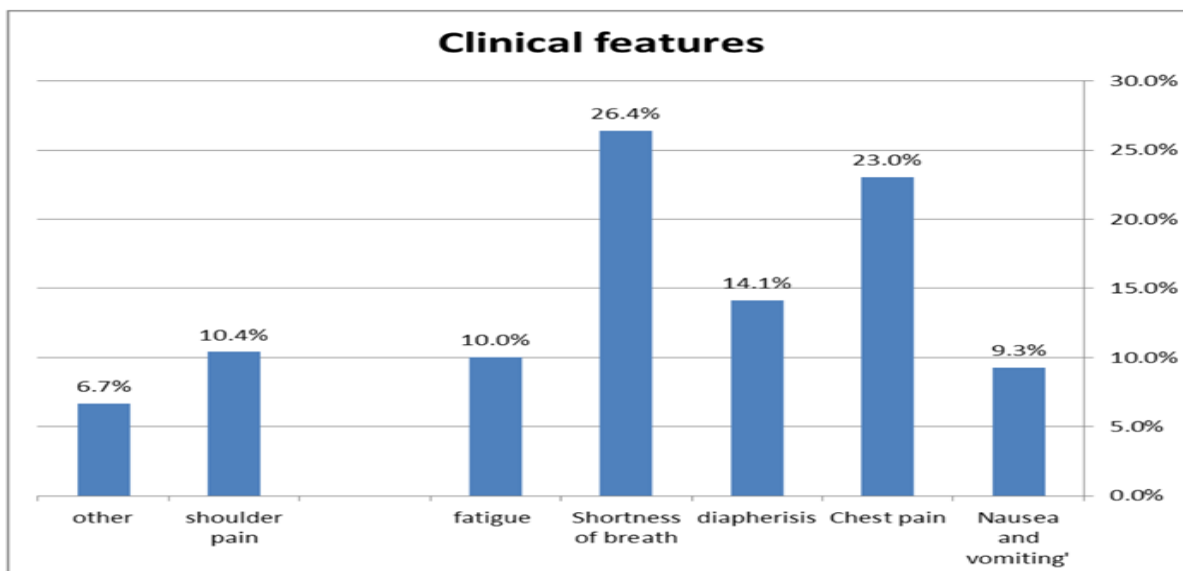Chart 3 The Chart below Shows the Co Morbidities of the Patients



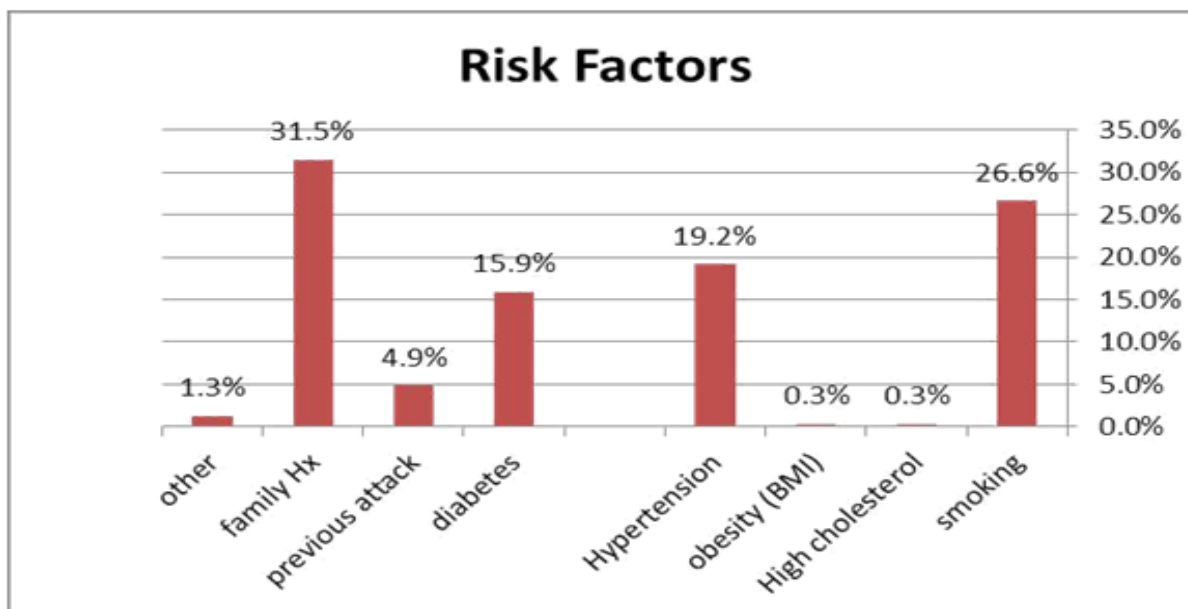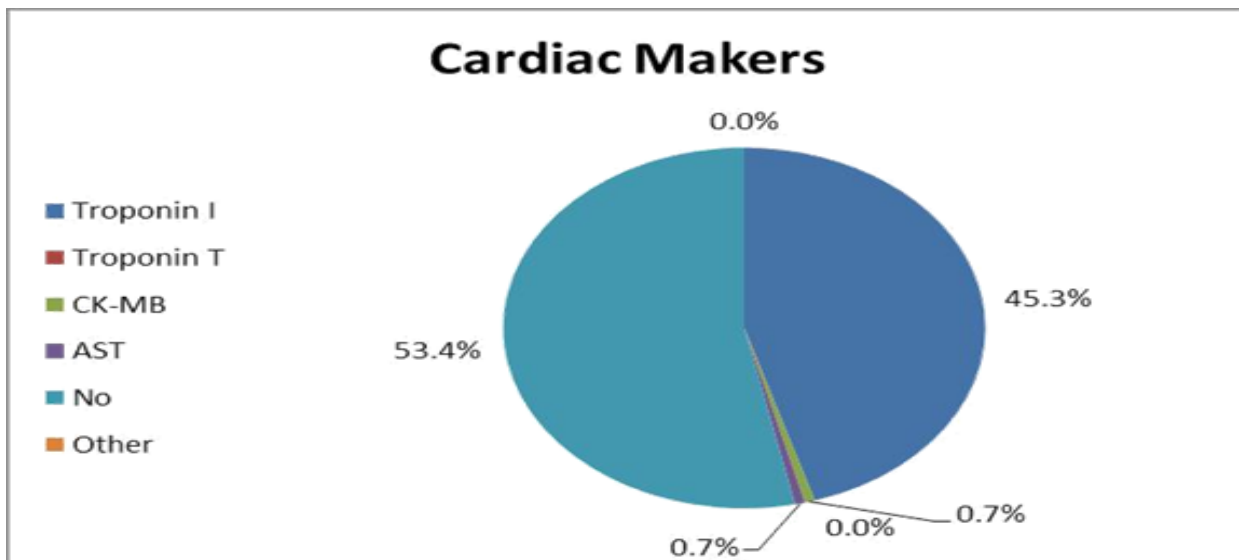Chart 4 The Chart below Shows the Clinical Features



Chart 5 The Chart below Shows the Risk Factors of the Patients

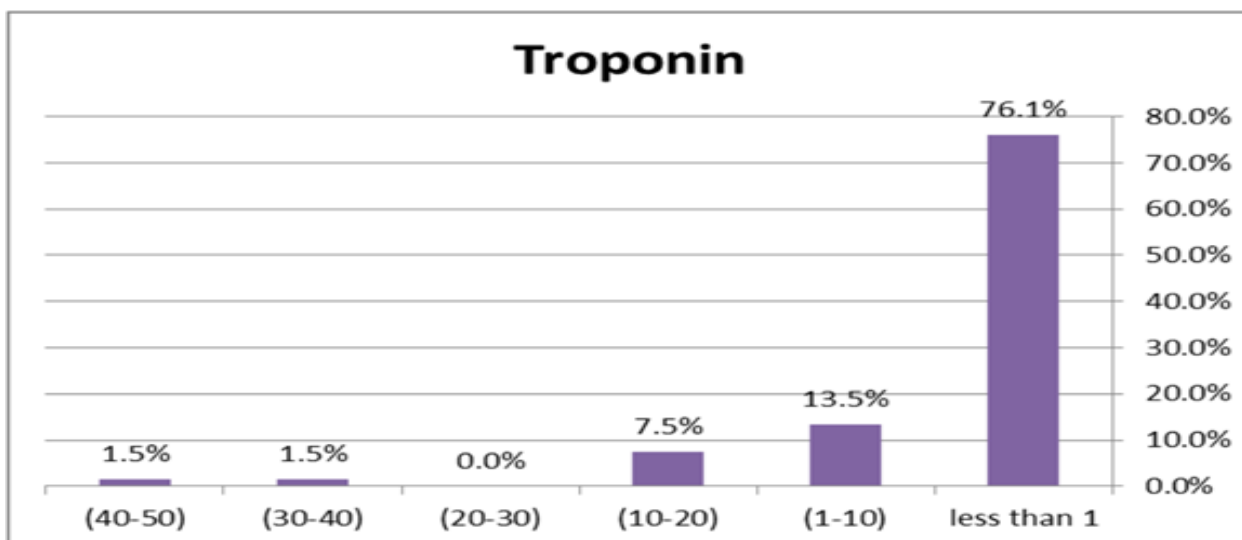Chat 6 The Chart below Shows the Cardiac Markers
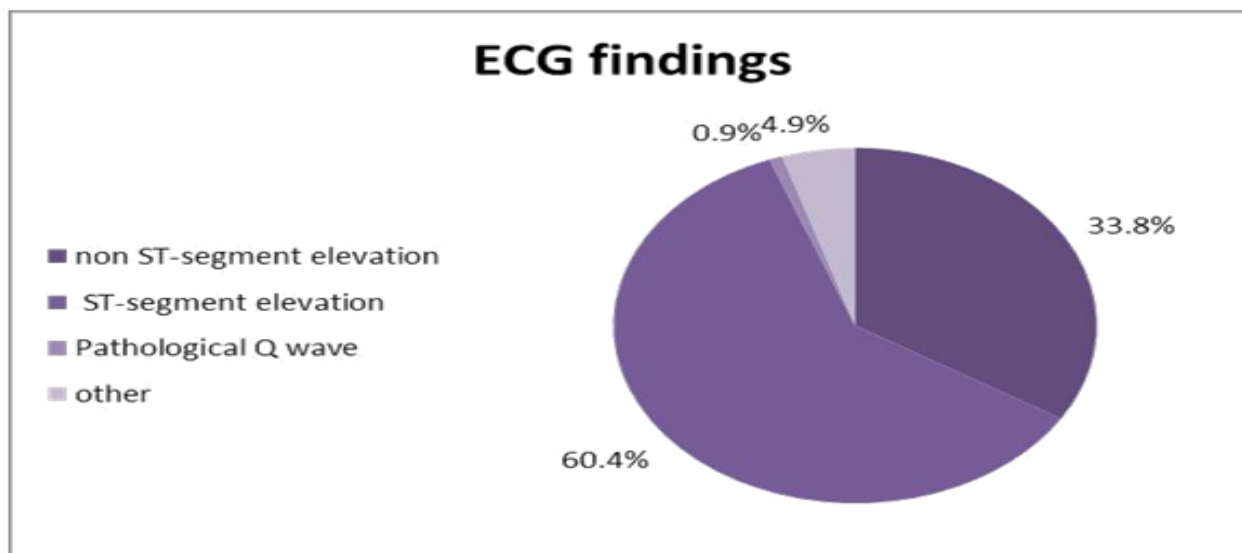


Chart 7 The Chart below Shows Troponin Levels



Chart 8 The chart below shows ECG findings

Table 1 The Table below Shows the Drug History of the Patients

| Drug Hx | |
|---|---|
| No | 49.6% |
| diuretic | 19.9% |
| ACE inhibitor | 11.3% |
| Insulin | 9.9% |
| antiplatelet | 5.7% |
| B blocker | 1.4% |
| smooth muscle relaxant | 0.7% |
| Angiotensin receptor blocker | 0.7% |
| Ca channel blocker | 0.7% |

Table 2 The Table below Shows the Eco Findings of the Patients

| Echo Findings | |
|---|---|
| Akynetic apex | 2.8% |
| Aortic stenosis | 16.0% |
| IHD | 2.8% |
| hypokalemia posterior inferior | 0.7% |
| LV systolic dysfunction | 11.1% |
| "Ischemic heart disease | 31.9% |
| Bilateral dilation | 0.7% |
| Concentric left ventricular hypertrophy | 0.7% |
| Dilated cardiomyopathy | 0.7% |
| Ejection fraction | 1.4% |
| MR/ mitral regurgitation | 2.8% |
| Moderate As / mild AR | 0.7% |
| Unremarkable | 27.8% |

Table 3 The Table below Shows the Relation between Age and ECG Findings

| Count | | Age | | | | | Total |
|---|---|---|---|---|---|---|---|
| | | 65.00 | 67.00 | 70.00 | 75.00 | 76.00 | |
| ECG | LF BBB | 18 | 0 | 0 | 0 | 0 | 18 |
| Findings | pathological Q wave | 0 | 0 | 0 | 0 | 71 | 71 |
| | Sinus bradycardia | 0 | 25 | 0 | 38 | 0 | 63 |
| | Sinus rhythm | 0 | 28 | 0 | 0 | 0 | 28 |
| | ST-segment elevation | 27 | 0 | 62 | 0 | 0 | 89 |
| Total | | 45 | 53 | 62 | 38 | 71 | 269 |

| Chi-Square Tests | | | |
|---|---|---|---|
| | Value | DF | Asvmp. Sig. |
| Person Chi- | 698.676[a] | 16 | .000 |
| Square likelihood Ratio | 659.110 | 16 | .000 |
| N of Valid Cases | 259 | | |

Table 4 The Table below Shows the Relation between Age and Clinical Features

| Count | | 65.00 | 67.00 | 70.00 | 75.00 | 76.00 | Total |
|---|---|---|---|---|---|---|---|
| | | | | Age | | | |
| Clinical | Chest pain | 0 | 0 | 62 | 0 | 0 | 62 |
| Features | diapherisis | 0 | 0 | 0 | 38 | 0 | 38 |
| | fatigue | 27 | 0 | 0 | 0 | 0 | 27 |
| | Nausea and vomiting' | 0 | 25 | 0 | 0 | 0 | 25 |
| | other | 18 | 0 | 0 | 0 | 0 | 18 |
| | Shortness of breath | 0 | 0 | 0 | 0 | 71 | 71 |
| | shoulder pain | 0 | 28 | 0 | 0 | 0 | 28 |
| Total | | 45 | 53 | 62 | 38 | 71 | 269 |

Table 5 The Table below Shows The Relation between Age and Risk Factors

| Count | | 65.00 | 67.00 | 70.00 | 71.00 | 75.00 | 76.00 | Total |
|---|---|---|---|---|---|---|---|---|
| | | | | | Age | | | |
| Risk | Diabetes | 49 | 0 | 0 | 0 | 0 | 0 | 49 |
| Factors | Family Hx | 97 | 0 | 0 | 0 | 0 | 0 | 97 |
| | High Cholesterol | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| | Hypertension | 0 | 0 | 0 | 0 | 0 | 59 | 59 |
| | Obesity (BMI) | 0 | 0 | 0 | | 1 | 0 | 1 |
| | Other | 0 | 0 | 0 | 4 | 0 | 0 | 4 |
| | Previous Attack | 0 | 15 | 0 | 0 | 0 | 0 | 15 |
| | Smoking | 0 | 82 | 0 | 0 | 0 | 0 | 82 |
| Total | | 146 | 197 | 1 | 4 | 1 | 59 | 308 |

| Chi-Square Tests | | | |
|---|---|---|---|
| | Value | Df | Asymp. Sig. (2-Sided) |
| Pearson Chi- Square | 1540.000[a] | 35 | .000 |
| Likelihood Ratio | 694.795 | 35 | .000 |
| N Of Valid Cases | 308 | | |
| a. 35 Cells (72.9%) Have Expected Count Less Than 5. The Minimum Expected Count Is .00. | | | |

# CHAPTER FIVE
## DISCUSSION

Age is a significant predictor of prognosis in people with ACS. Symptoms, which are a crucial component in the patient's choice to seek care, are important to proper triage and impact the decision to pursue further examination and therapy beginning. The major complaint of individuals suffering with ACS is typically chest discomfort. On first examination, however, a significant proportion of individuals may exhibit unusual or no symptoms. Atypical symptom implies that the patient's primary complaint is not chest pain, but rather other gastrointestinal or respiratory symptoms associated with less severe chest pain.[12]

For the duration of this study 151 patients were admitted with acute coronary syndrome at Sudan heart center hospital. With aim of assessing the clinical feature and risk factors of acute coronary syndrome .

The majority of the patients were between the ages of 65 and 70. Despite advances in treatment, the short-term prognosis for elderly people with ACS remains very poor. The majority of ECG findings were non-ST segment elevation and ST segment elevation, and the majority of ECO findings were ischemia. 52.3 percent of the patients had no drug history, while 47.7 percent had drug history. The majority of the elderly patients had symptoms of chest pain, diaphoresis and shortness of breath, as well as hypertension and smoking as a risk factor.

In contrast to our findings, other similar studies conducted in Europe Women were less likely than men to present with ST elevation in younger ACS patients and were more likely to be discharged with a diagnosis of unstable angina. There were no differences in clinical presentation between younger and older patients. Women of all ages had less extensive atherosclerosis. The findings suggest that the pathophysiology of ACS differs in younger women but not in older women.[13,14]

Similar research in 2006 found that chest discomfort was dramatically reduced in older patients; nevertheless, other investigations found that unusual symptoms such as dizziness/syncope, dyspepsia, and weakness were more common in older people.[14]

Another comparable study published in 2015 found that usual symptoms such chest pain, arm discomfort, jaw/neck pain, and dyspnea were more predictive of ACS in older patients than in younger patients.[15]

Another comparable research published in 2012 found that older patients were more likely to be women with hypertension, diabetes, and renal failure, whereas younger patients were more likely to be smokers. In elderly individuals, non-ST-elevation myocardial infarction and heart failure were more common. Older age was linked to less use of evidence-based therapy and a higher death rate. Age was found to be an independent predictor of death. Over the course of the research, the relative reduction in death rates was greater in younger patients than in older individuals.[16]

# CHAPTER SIX
## CONCLUSIONS & RECOMMENDATIONS

➢ *Conclusions*

Acute coronary syndrome is a leading cause of death in the elderly. Identifying ACS symptoms and factors associated with these symptoms is critical for successful management and may aid in early detection and appropriate medical treatment. This research was focused on the clinical features and risk factors of acute coronary syndrome in the elderly, and after collecting several pieces of data, I came to a conclusion that, the results yielded by this study coincide with those produced by similar international studies conducted in developing countries.

Obesity, hypertension, and smoking appear to be risk factors for typical ACS symptoms in older or younger patients in this study. However, Men appeared to be more susceptible to having acute coronary syndrome in old age than women, the majority of them had symptoms of chest pain, and shortness of breath and diaphoresis, and were at risk due to hypertension, smoking.

More research should be done on the subject to evaluate several emerging risk factors such as lipoprotein abnormalities, hypercoagable states, elevated homocysteine levels, inflammation markers, and platelet glycoprotein.

➢ *Recommendations*

Several benefits and drawbacks were formulated throughout the conduction of this study.

Chronic diseases, as well as age-related physiological and pathological features, can influence the presentation of ACS symptoms in the elderly. Understanding the factors associated with symptoms may aid in the early detection and better medical treatment of patients suffering from acute coronary syndrome.

Obtaining an accurate history of the patient with cardiac complaints is one of the most important tasks of clinical treatment and care providers. Identifying the symptoms of ACS is critical for effective and immediate treatment. The findings imply that individuals suspected of having heart ischemia disorders at emergency rooms should have their histories thoroughly examined.

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**APPENDICES**

❖ *Appendex 1*

➢ *Data Collection Sheet*

- Age:---------------
- gender:--------------
- marital status:-----------
- Job:-----------------
- residency:------------------
- Co-morbidities and chronic illness:-----------------
- Drug Hx:-------------

| Clinical features | |
|---|---|
| Chest pain | |
| Nausea or vomiting | |
| Diapherisis | |
| Shortness of breath | |
| Fatigue | |
| Shoulder pain | |
| Others (determine) | |

| Risk factors | |
|---|---|
| Smoking | |
| High cholesterol | |
| Obesity (BMI) | |
| Hypertension | |
| Diabetes | |
| Previous attack | |
| Family Hx | |
| Others (determine) | |

| Cardiac markers | Raised (yes , no) | Value |
|---|---|---|
| Troponin (I) | | |
| Troponin (T) | | |
| CK-MB | | |
| Alanine transaminase | | |
| Aspartate transferease | | |
| Others (determine) | | |

| ECG findings | |
|---|---|
| ST –segment elevatio | |
| Non ST-segment elevation | |
| Pathological Q wave | |
| Others (determine) | |

Echo findings:-----------------------------------------------------------------------------------

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