ADDIS ABABA UNIVERSITY COLLEGE OF HEALTH SCIENCES

SCHOOL OF MEDICINE DEPARTMENT OF EMERGENCY MEDICINE

A CROSS-SECTIONAL STUDY ON FACTORS ASSOCIATED WITH DELAYED HOSPITAL ARRIVAL OF PATIENTS WITH ACUTE CORONARY SYNDROME IN ADDIS ABABA.

A RESEARCH THESIS SUBMITTED TO THE DEPARTMENT OF EMERGENCY AND CRITICAL CARE MEDICINE, COLLAGE OF HEALTH SCIENCE FOR THE PARTIAL FULFILMENT OF THE REQUIREMENTS FOR A SPECIALTY CERTIFICATE IN EMERGENCY AND CRITICAL CARE

Principal Investigator: Dr. Aklilu Belay, MD

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A cross-sectional study on factors associated with delayed hospital arrival of patients with acute coronary syndrome in Addis Ababa.

Addis Ababa, Ethiopia

Principal investigator: Dr. Aklilu Belay, MD

Advisors:

Prof Aklilu Azazh (professor of emergency and critical care medicine and internist)

Dr Nahom M (emergency and critical care medicine specialist)

November ,2024

Addis Ababa, Ethiopia

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Name of investigator	Dr. Aklilu Belay
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Address of the investigator	Cell phone: +251912726462
	Email: aklilu725@gmal.com
Names of advisors	Prof Aklilu Azazh Dr Nahom Mesfin

November,2024

Addis Ababa, Ethiopia

Declaration

The principal investigated, and the undersigned declared that this is my original work. All sources and materials used in this paper are duly acknowledged.

Name …Dr Aklilu Belay

Email……aklilu725@gmail.com

Submission date …….

Place …Addis Ababa University.

This thesis has been submitted after my approval as an adviser

Name of adviser …Prof. Aklilu Azazh

Signature ……

Date……

Name of adviser …Dr Nahom Mesfin

Signature ……

Date…….

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Acronyms

AAU: Addis Ababa University

ACS: Acute Coronary Syndrome

CCU: Cardiac care unit

CPR: cardiopulmonary resuscitation

COPD: chronic obstructive pulmonary disease

ECG: electrocardiograph

EMCC: Emergency and Critical Care

EMS: Emergency medical service

ICU: Intensive Care Unit

IQR: inter quartile range

MI: myocardial infarction

STEMI: ST-segment elevation myocardial infarction

NSTEMI: non-ST segment myocardial infarction

SPH: Saint Peter Hospital

SPHMMC: Saint Paul Hospital Millennium Medical Collage

PCI: percutaneous coronary intervention

POC: point of care

T2DM: Type 2 diabetic mellites

TASH: Tikur Anbessa Specialized Hospital

ZMH: Zewditu Memorial Hospital

Abstract

Background: Acute coronary syndrome remains one of the most significant health burdens of society with significant mortality and morbidity. Lack of awareness about the symptoms and non-availability of infrastructure are associated with a delayed presentation to hospital from the the onset of symptoms in different research.

Objectives: To understand the importance of timely presentation in the management of acute coronary syndrome (ACS) and identify the barriers and facilitators that contribute to delayed presentation, leading to potential adverse outcomes in selected hospitals of Addis Ababa.

Methods: The study is a prospective cross-sectional study of ACS patients who were treated at the four mentioned hospitals. Data was collected from the patients who were being treated in the mentioned hospitals during the study period. Semi-structured questionaries were administered by translating to their preferred language. Data was cleaned, coded, and entered into SPSS version 27. Basic sociodemographic and clinical characteristics were described using frequency, mean, median, percentile, and standard deviation. The association between sociodemographic factors was determined using bivariate and multivariate logistic regression.

Results: Out of the 114 participants 31% are females and the rest are males. Majorities of the study participants (54%) are age between 40 and 60 years old. Most patients came from Addis Ababa and most of the study participants are married and 33% are government employees.

The average time of presentation is 14 hours from the onset of symptoms and 88% of the cases presented after 4 hours of symptom onset.57% of the patients presented after 12 hours of onset of symptoms. Chest pain was the primary complaint in 88 patients (77.9%) The overall complication was 30.7%. ADHF was the most prevalent complication. Level of education, insurance availability, and mode of transport were the most important determinants of prehospital delay.

Conclusion: The study found that acute coronary syndrome is common in older age greater than 40 years old and it is predominant in males. It has also shown that lack of health insurance coverage low level of education and living in rural areas are associated with delayed hospital arrival.

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1. Introduction

1.1Background

Acute coronary syndrome, also known as heart attack, is a spectrum of disease that contains three different subclasses: acute ST-segment elevation myocardial elevation (STEMI), acute non-ST segment myocardial infarction (NSTEMI), and unstable angina (1). The main reason for the development of ACS is compromised blood flow to the heart (2).

Mortality of ACS is either electrical or mechanical complication. Electrical complication tends to occur a bit earlier than mechanical complications and includes any form of arrhythmia but the commonest are sinus tachycardia, sinus bradycardia, and premature atrial contraction. Mechanical complication tends to occur with typicality after 24 hours. It may result in cardiogenic shock due to pump failure, free wall rupture, and rupture of the ventricular septum (3).

As it is a life-threatening and critical condition that requires immediate emergency and critical care intervention, timely access to pre-hospital care plays a crucial role in reducing morbidity and mortality associated with acute coronary syndrome (3). Rapid diagnosis and treatment are essential in its management to minimize irreversible cardiac damage (4).

However, numerous barriers can obstacle the timely presentation of patients with ACS symptoms to healthcare facilities. Delays in seeking medical care significantly affect mortality and complications.

Timely access to pre-hospital care is crucial in ACS management. Different barriers are associated with delayed presentation, including patient-related, system-related, sociocultural, and health literacy barriers (5).

1.2 Statement of the problem

Acute coronary syndrome has significant mortality and morbidity especially in the setting of delayed presentation because it hinders timely access to life-saving medical interventions and increases the risk of adverse outcomes (6). Greater than 30% of ACS patients die because of complications in Addis Ababa, Ethiopia (7). Lack of awareness among the general population about its symptoms and the urgency of seeking immediate medical attention contributes to delayed presentation. Misinterpretation of symptoms, particularly in atypical presentations, leads to delays in seeking appropriate pre-hospital care, and patient denial and fear of receiving a diagnosis of a life-threatening condition often result in delayed presentation of these patients.

ACS presentations are more likely to occur during non-business hours, including evenings, weekends, and holidays. Limited availability of healthcare services and reduced awareness during these periods can contribute to delays in seeking medical care.

Socioeconomic factors, such as limited access to healthcare, lack of insurance coverage, and financial constraints, create barriers to prompt ACS presentation. Language and communication barriers, particularly in multicultural and diverse populations like in our country, hinder effective communication and delay presentation also (8).

There is limited data regarding the topic in Addis Ababa despite the significant burden of the diseases. Identifying factors associated with poor prehospital care of ACS is important to decrease the burden of the disease, it is also important to influence policymakers and authorities. This research can also address the community awareness gap regarding early presentation.

1.3 Significance of the study

Timely access to pre-hospital care is critical in reducing morbidity and mortality associated with ACS. Knowing the barriers that contribute to delayed presentation helps healthcare systems plan specific and targeted interventions to address these obstacles and facilitate early recognition, diagnosis, and treatment of ACS. By reducing delays, patient outcomes can be improved, leading to decreased cardiac damage and improved survival rates (9).

Identifying the barriers to the timely presentation of ACS helps healthcare systems allocate their resources more effectively and fairly. Prompt presentation of ACS patients can also lead to cost savings in healthcare systems. Early diagnosis and treatment reduce the need for complex and expensive interventions, such as coronary artery bypass grafting or percutaneous coronary interventions. Additionally, timely management of ACS reduces the length of hospital stays and associated healthcare costs.

Understanding the barriers that contribute to delayed presentation of ACS helps address health disparities and promote health equity and knowing the facilitators will be important to continue good starts.

Findings from studies on factor affecting time of presentation in ACS patients can inform public health interventions and educational campaigns. Raising awareness about ACS symptoms, promoting the importance of timely medical care, and addressing misconceptions can empower individuals to seek help promptly.

In summary, the significance of knowing barriers of timely presentation will be applied in making targeted intervention for the barriers and ultimately improving patient’s outcome. It can be used as future reference also.

2. Literature review.

Acute coronary syndrome (ACS) is a critical medical condition requiring prompt recognition and management to minimize morbidity and mortality (10). Timely pre-hospital care service plays an important role in ensuring early intervention and optimal outcomes for these patients. However, a lot of factors can contribute to delayed presentation, leading to suboptimal care and adverse outcomes. Several barriers contribute to the delayed presentation of ACS. Individual factors, such as lack of knowledge about symptoms and their significance, fear or denial, and socioeconomic factors, have been identified as barriers in multiple studies. Community-related barriers, including distance to healthcare facilities and lacking access to transportation, also contribute to delays (11).

One meta-analysis and systemic review of 28 studies in China was published in 2010. Age greater than 40, misperception of ACS symptoms, financial constraints, lack of transportation lack of nearby health facilities, and sex were the most important reasons for prehospital delays in the country (8). Another study from China which is called the PEACE prospective AMI study conducted across 53 hospitals in China's 21 provinces, involving a total of 3,434 patients, it was determined that the typical and mean duration from the onset of symptoms to hospital presentation was approximately 4 hours The study recommends address health insurance related obstacles, expansion of emergency medical services (12).

Another large cross-sectional study in Iran studied 2103 STEMI patients for whom PCI was done from 2016 to 2018, in the capital of Iran, Tehran. The analysis of the data revealed that the median presenting time after the onset was 279 minutes, with an interquartile range (IQR) of 120-630 minutes. Notably, female was associated with more delayed presentation but higher educational level was associated with more early presentation Age exhibited a weak but statistically significant relationship but there was no significant association between body mass index and time of presentation. Atypical chest pain and epigastric pain were linked to more delayed presentation than the typical symptoms. Moreover, a history of diabetes and hypertension was found to result in delayed presentation. In light of these findings, it is strongly recommended to implement effective measures aimed at raising public awareness about the symptoms of ST-elevation myocardial infarction (STEMI) and emphasizing the importance of seeking immediate and appropriate medical help (6).

Between July 2019 and June 2020, a prospective cross-sectional study was undertaken in Bangladesh, encompassing 21 district hospitals with tertiary facilities and 6 medical college hospitals offering cardiac care units (CCUs). The investigation discerned noteworthy associations between prehospital delay and various patient factors, including age, relative living location, education level, and employment level. While logistic regression did not establish a significant relationship between delay and patient age, the findings indicated a rise in delay with increasing age. Notably, nearly 29% of patients under 40 years old were transferred to the center after 12 hours from the start of illness, compared to 53.7% of patients aged over 60 years. In terms of residential location, 41% of patients in rural areas were hospitalized after 12 hours, while the corresponding figure for urban areas was 23%. Moreover, the study revealed a positive correlation between patients' education level and rates of early hospitalization. Specifically, the percentages of hospitalization within 12 hours for illiterate, primary-educated, secondary-educated, and higher-

educated patients were 57%, 65%, 58.2%, and 86.6%, respectively. Lack of job which they call unemployment was much linked to delayed presentation to hospitals even though a significant number of employed people failed to come early or within 12 hours. In conclusion, this study underscores the significance of several sociodemographic factors in Bangladesh, including rural residence, lower education levels, and unemployment, in contributing to prehospital delay (13).

A cross-sectional study conducted in Greece planned to see the factors contributing to delayed presentation among patients with acute myocardial infarction (AMI). The study included around 480 AMI patients who sought care at tertiary hospitals over two years. Several factors were identified as being correlated with delayed hospital arrival. These factors included the absence of a companion or escort during the journey to hospital [OR] 2.1), if patients had T2DM (OR 3.4), lack of symptoms of dyspepsia were associated with delayed presentation (OR 9.2), lack of gastrointestinal symptoms like nausea and vomiting was also resulted in delayed in hospital presentation (OR 16.9), and residing more than 10 km away from the hospital (OR 19.6) is also very important factor that contributed for delayed presentation. The study concludes that healthcare service planning should consider a multitude of factors that may contribute to delayed hospital arrival among AMI patients. Health policy initiatives aimed at improving accessibility to healthcare services are recommended to address these challenges (14).

One study done at Tibebe Ghion Specialized Hospital in Bahir Dar; Ethiopia concluded that the average time of presentation for ACS patients was 5.8 days. It also elaborates that low educational levels, lack of health insurance, and using public transport are associated with delayed hospital arrival (15).

Timely prehospital care plays a vital role in reducing the mortality and morbidity associated with acute coronary syndromes (ACS). It begins with the prompt recognition of ACS symptoms, including chest tightness, shortness of breath, and other related symptoms, by either the patient or bystanders. Activation of emergency hospital service through direct or telephone contact is crucial. The next step involves the early acquisition and interpretation of a 12-lead electrocardiogram (ECG) to determine whether the patient is experiencing ST-segment elevation myocardial infarction (STEMI) or non-ST-segment elevation ACS (NSTE-ACS). ECG assessment is vital as it guides subsequent management decisions, allowing for appropriate and timely interventions (16).

In the prehospital setting, the provision of comprehensive care measures is essential to address acute coronary syndrome (ACS). This includes the implementation of supportive measures such as effective pain management, administration of oxygen therapy, appropriate intravenous fluid administration, and diligent management of associated conditions such as heart failure or arrhythmias. Additionally, risk stratification of ACS patients in the prehospital phase is of utmost importance. This involves crucial assessments, including the measurement of troponin levels, which aid in determining the severity and prognosis of the condition. By integrating these multifaceted approaches, prehospital care can significantly contribute to optimizing patient outcomes in cases of acute coronary syndrome.

ARTICA trial is an RCT designed to examine the effectiveness of early rule-out strategies for ACS using an early rule-out strategy. The trial aims to evaluate the cost-effectiveness of this strategy within 30 days. The study employs a modified HEART score, which incorporates a point-of-care troponin T measurement, to identify low-risk chest pain patients. The trial findings indicate that it is both feasible and safe for ambulance staff to use this modified HEART score, combined with a high-sensitivity troponin T measurement performed in the hospital laboratory, to identify low-risk chest pain patients. This conclusion holds significant implications for improving the efficiency and accuracy of triaging for low-risk patients (17).

Several studies have provided evidence supporting the administration of medications such as aspirin, nitroglycerin, and opioids for pain relief in the prehospital setting for patients with suspected ACS. A systematic review of three retrospective studies focusing on aspirin and one study on nitroglycerin administered prehospital to patients with acute myocardial infarction. The results of the review revealed significant benefits associated with the administration of aspirin and nitroglycerin at pre-hospital setup. Specially aspirin administration was linked to lower mortality rates at both 30 days and 1 year, as evidenced by odds ratios of 0.59 and 0.47, respectively, along with narrow confidence intervals of 95%. Similarly, prehospital nitroglycerin administration was associated with decreased mortality rates at both 30 days and 1 year, with odds ratios of 0.34 and 0.38, respectively, and again, narrow confidence intervals of 95%. The finding suggested that prehospital administration of this medication by paramedics is beneficial for patients suspected of acute coronary syndrome. However, it is important to note that while these systematic reviews provide valuable insights, the certainty of evidence remains relatively low (18).

3. Objectives

3.1 General Objective:

To examine the factors responsible for delayed hospital arrival of patients with acute coronary syndrome in Addis Ababa.

3.2 Specific Objectives:

To study the time of arrival of patients with ACS patients.

To determine the factors contributing to delayed presentation of ACS in the pre-hospital setting and its impact.

To assess the level of utilization of prehospital care for acute coronary syndrome.

4.Methoeds and Materials

Study setting

The study was conducted in Addis Ababa in a selected government hospital deducted to manage patients with acute coronary syndromes. Tikur Anbesa specialized hospital which is one of the largest hospitals in the country. It is the main referral hospital from the rest part of the country. It is also a teaching center for specialty and sub-specialty programs. It was selected for our research for the above qualities and convenience. Zewditu Memorial Hospital is the second hospital where this research was being done. ZMH is a referral hospital located in Addis Ababa.it is being used as one of the referral centers for patients coming from health centers as well as hospitals outside Addis Ababa. Saint Paul Hospital Millennium Medical College is another fast-growing government hospital and medical college. The hospital is older than 75 years but the medical college was established in 2000 EC. It has both Cardiac intensive units established in collaboration with Saint Peter Hospital and CAT LAB where Percutaneous intervention is being done for acute coronary syndrome among the hospitals where the study took place. These hospitals were selected as they are the main centers of referral for patients with acute coronary syndrome.

Study design

A Prospective cross-sectional study of patients with acute coronary syndromes was conducted from May 2024 to September 2024

Source Population

The source population in this study were patients with acute coronary syndrome.

Study population

The study population in this study was patients with acute ACS who have been treated in the selected government hospitals in Addis Ababa.

Sample size and sampling methods

The sampling method was convenience sampling because every patient who visited the above hospitals was included.

The sample size across-sectionally with a single population proportion is given by the formula

$n = (Z\alpha/2)2\ p\ (1 - p)/d2$

Here n is the minimum required sample size, Zα/2 is the value under the standard

normal table for a given confidence interval (1.96 for 95% CI), p is the best estimate

of prevalence since we don't have a previously done study in this area with similar article except one small study in the country side, I took 50% to increase the strength of the study, and d is the margin of error (0.05).

$n = (1.96)2\ 0.5(1 - 0.5)/0.052 = 384$

I used correction for the small population, after analyzing HMIS records in the previous four months, the maximum cumulative number of patients over four months in the above hospitals was 120 and this number was taken as the maximum population. So, using the formula sample size = n*N/n+N=102. N is our corrected sample size while n is the total sample before correction (384). adding a 10% non-response rate, the final sample size will be 114.

Inclusion and exclusion criteria

Inclusion criteria

All patients with acute coronary syndrome who are being treated at the above specific hospital during the study period.

Age greater than 18 years.

And those who are voluntary.

Exclusion criteria

Patients who are not willing to participate.

Patients whose diagnosis is not certain or ruled out after initial consideration of ACS.

Age less than 18.

Age-related memory loss.

Variables

Independent Variables:

Age, sex, Education level of education, Occupation, Presence of comorbidities, Perception of symptoms financial resources and healthcare system support, and geographical accessibility. Cultural and social factors.

Dependent variables

Time of presentation

Operational definitions

Early presentation: This is defined as a presentation to hospitals or health facilities within 12 hours from the onset of symptoms. This time frame is adapted from nationwide research in Bangladesh where they divide early and late presentations where 12 hours being the cut value (13). This definition is only for operationalize, otherwise time of presentation was analyzed both with 4 hours and 12 hours cut points.

Delayed presentation: If patient presentation is after 12 hours from symptoms onset.

Typical symptoms: If a patient presents with chest pain described as a tightness, pressure, squeezing, or burning sensation, pain radiates to the arm, and shortness of breath.

Atypical symptoms: If ACS patients presented with symptoms other than those mentioned above like nausea and vomiting, fatigue and weakness, lightheadedness, and heartburn.

Awareness: If patient knows about ACS symptoms, heard about it in different platforms, knew someone who had ACS or if they understand the symptoms as sudden and dangerous heart conditions.

Data collection tools

Semi-structured questionnaires were prepared; data was collected directly from patients who were being treated in the above hospitals. These questionnaires were prepared in Google Forms. Questionaries were adapted from the above research in Bangladesh (13) and they were modified in the local context. 5 data collectors were using mobile phones while asking for the pre-structured questionnaire Data was automatically stored in the main investigator's Google Drive quality control.

After data collection and before inputting the data into the SPSS program, a thorough review was conducted to ensure the completeness and accuracy of the responses. As part of the study protocol, a subset comprising 5% of the study population has undergone a pretest to validate the data collection instruments and procedures. It was done at Zewditu Memorial and Tikur Anbessa specialized Hospitals. It showed there was no ambiguity in the questionnaires.

Data processing and analysis

For processing and analyzing data, the following steps were followed Firstly, the completed questionnaires were coded, ensuring consistency and ease of data entry. Subsequently, a manual review of the coded questionnaires was conducted to verify accuracy and address any discrepancies. The data was then entered into Microsoft Excel, enabling efficient organization and manipulation. For further analysis, the dataset was exported to SPSS version 26, a statistical software package commonly used for data analysis. Descriptive statistics such as proportions, means, standard deviations, and medians were calculated to summarize the sociodemographic and background characteristics of the study population. After that, both multivariant and bivariant binary logistic regression were used.

Ethical clearance

After getting approval from the ethical review committee of the Department of Emergency and Critical Care Medicine at TASH, Addis Ababa University, data collection was begun. All the 4 principles of ethics were followed. These are beneficence, non-maleficence, autonomy and justice.

Dissemination of results

The dissemination of study results will involve an organized plan to maximize accessibility and impact. Firstly, the findings will be prepared for publication in reputable academic journals, ensuring wide accessibility to the scientific community. Additionally, efforts will be made to present the study at conferences and symposiums, both at national and international levels.

5. Result

5.1 Sociodemographic characteristics

Out of 114 participants, 36 patients (31%) were females and the rest were males. Majorities of the study participants were age between 40 and 60 years old (54%, 95% CI 51-72). Most of them came from Addis Ababa (73%). From all the participants 67% were married and 33% were government employees. Regarding the level of education, there was fair distribution among different levels, with college-level education being a bit dominant (28%). Most of the patients (52%) did not have health insurance for this pocket money and hospital social service was the means of treatment. If patients have health insurance, they will get all service which is available in the hospitals and they will also be able to take drug from government pharmacy outside the hospitals.

Out of 114 patients 63 (55.8% CI 53-73) patients have hypertension,32 patients (28.3% CI 23-42) have T2DM, 7 patients have CK,5 patients have COPD, and 12 patients have ischemic heart disease.

The number of patients who had awareness of Acute coronary syndrome was less than 40%. In 59.6 % of the participants, the symptoms started during the daytimee.42.1% of the participants first went to a health center before getting referred to their respective hospitals. A quarter (24.6%) of the participants came directly to the above four hospitals while the rest were referred from private clinics and district hospitals. Only 6 patients (5.3%) received medication before reaching first medical contact. 59.4% of patients at health center and private clinic received nonspecific management .62.3% and 65.8% of the participants didn't have any government and private ambulance phone numbers. Of the participants who had their ambulance phone numbers, only 29 patients (25% of the participants and 58 % of those who had ambulance numbers) called the ambulance. The mode of transport from the initial medical site to respective hospitals was by ambulance in 40% of the referrals. Only 7 patients (6.1%) came to the primary health site by ambulance. Regarding geographical location,84.2% of the participants live within 5-10 km of health facilities, and the remaining 15.4%of participants needed to travel greater than 10 km to get a medical service.

Table 1 sociodemographic characteristics

		Count	Column N %	95.0% Lower CL for Count	95.0% Upper CL for Count
age in range	age less than 40years	14	12%	8	22
	age between 40 and 60 years old	61	54%	51	71
	age above 60 years old	39	34%	30	49
Gender	Female	36	32%	27	46
	Male	78	68%	68	87
Marital status	Divorced	19	17%	12	28
	Married	76	67%	66	85
	Single	8	7%	4	15
	Widowed	11	10%	6	18
highest level of education	collage level	32	28%	23	42
	no formal education	24	21%	16	33
	primary education	17	15%	11	25
	secondary level education	23	20%	16	32
	university level	18	16%	11	27
Health insurance	No	59	52%	49	69
	Yes	55	48%	45	65
First visit to current Complaint	health center	48	42.1%	38	58
	other hospital	19	16.7%	12	28
	private clinic	19	16.7%	12	28
	this hospital	28	24.6%	20	38
Do you know any government ambulance phone number?	No	71	62.3%	61	81
	Yes	43	37.7%	33	53
	No	75	65.8%	63	83

do you know any private ambulance phone number?	Yes	39	34.2%	30	49
Mode of transport to the primary site		7	6.1%	5	11
mode of arrival to hospital	Ambulance	45	39.5%	35	55
	private care	14	12.3%	8	22
	Taxi	43	37.7%	33	53
	Walking	12	10.5%	7	20
Average distance of residency from health facility	< 5 KM	18	15.8%	11	25
	>10 KM	43	37.7%	33	53
	5-10 KM	53	46.5%	43	63

5.2 Time presentation from the onset of symptoms.

Regarding the time of presentation,57% of the cases presented as delayed which is greater than 12 hours from the onset of symptoms (95% CI 55-75), and the remaining presented as early. The minimum, maximum, and average time from the onset of symptoms to the first medical visit were 1 hour,144 hours, and 14.04 hours respectively. The minimum, maximum, and average time from first medical contact to current hospitals were 1,66, and 7 hours respectively. Only 14 patients (11.9%) presented in the first 4 hours after the onset of symptoms while the remaining 88.1% presented after 4 hours. (See fig 2)

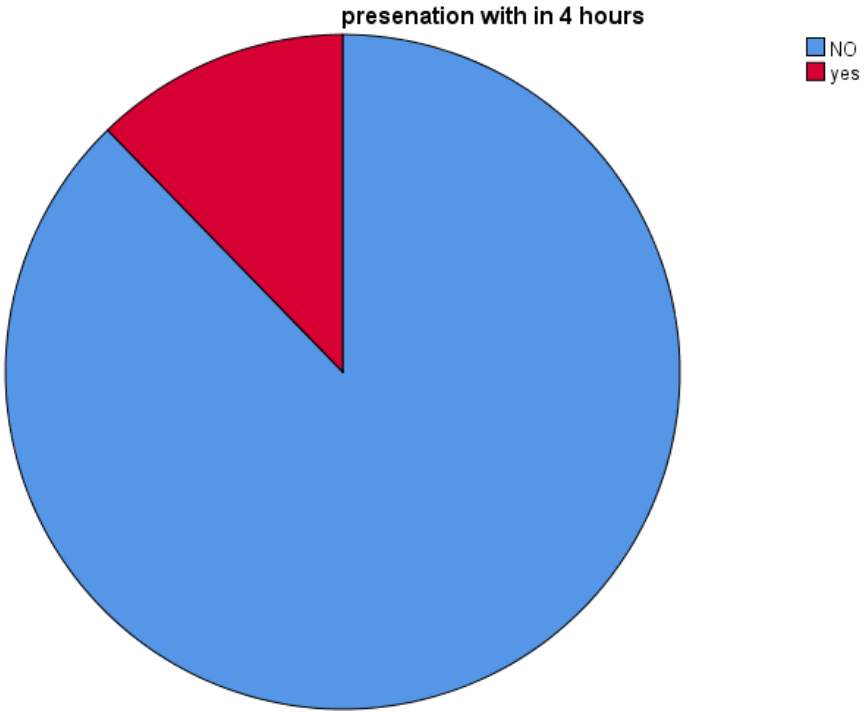

Figure 1 proportion of golden hour presentation

5.3 Clinical presentation and Complication

From 114 patients who participated in this study, chest pain was the primary complaint in 88 patients. Diaphoresis was complained of in 53 patients (46.5%). Shortness of breath was present in 86 patients (76.1%). The remaining patients who don't have chest pain presented with nausea, vomiting, and epigastric pain. The majority of the patients (52%) were categorized as ST-elevation myocardial infarction and 32% of the cases were non-ST segment myocardial infarction. The remaining patients were categorized as having unstable angina.

Almost all patients received the standard medical treatment. Percutaneous intervention was done for 31 patients (27.4%) but thrombolytics and coronary artery bypass grafts were done for none of the patients.

Regarding complication and treatment outcome, the overall complication was 30.7%. Acute decompensated heart failure was the most common complication which occurred in 18 patients (15.8). Arrhythmia was observed in 8 patients (7%). Ventricular tachycardia and Atrioventricular blocks were the frequent arrhythmias observed with a frequency of 3 each. Atrial fibrillation and ventricular fibrillation were also documented in 1 patient each.9 patients (7%) died.

Table 2 Clinical presentation and complication

		Count	Column N %
Clinical presentation	Chest pain	88	77.9
	Diaphoresis	53	46.5
	Nausea and vomiting	50	43.9
	Shortness of breath	86	76.1
Complications	No	79	69.3%
	ADHF	18	15.8%
	ARRYTHEMIA	8	7.0%
	Bleeding	0	0.0%
	STROKE	0	0.0%
	RE INFARCTION	0	0.0%
	Death	9	7.9%
TYPEOF ARRHTEMAI	atrial fibrillation	1	12.5%
	VITAC	3	37.5%
	fit fibrillation	1	12.5%
	Bradyaqrrthemia	0	0.0%
	Blokes	3	37.5%
Reperfusion therapy	No	82	72.6%
	THROMBOLYTICS	0	0.0%
	PCI	31	27.4%
	CABG	0	0.0%

5.4 Determinants of Prehospital delay

Bivariate binary logistic regression was used to see if there is an association between sociodemographic factors and prehospital delay. Those variables with a P-value of <0.25 in bivariate analysis were included for multivariant analysis.

According to the results of this research, the level of education has a significant effect time of presentation. A patient who has no formal education tends to present lately compared to a higher level of education p-value of 0.0018, AOR 1.55). This means people with no formal education are 1.55 times more likely to present lately when compared to college and university level educates. The presence of health insurance is also a significant contribution to the time of the presentation. A patient who owns health insurance tends to come early to healthcare facilities compared to a participant who doesn't have health insurance (p-value -0.002, AOR 3.2).

Another important factors which affect the time of presentation is the relative distance from health facilities. A patient who lives within 5KM from health facilities tend to present timely when compared with distance dwellers (P vale-0.016, AOR 0.8). a Patient who lives at a distance greater than `10Ktendssnd to present lately compared to those less than 10 (p-value 0.004, AOR 1.7) This shows that the distance from health facilities is an important determinant of the time of presentation.

Using an ambulance as a mode of transport is associated with the timely presentation of ACS patients when compared to other means of transport (p-value -0.032, AOR -0.86)

The study did not find any association between age, sex, address, or marital status. Multivariate binary logistic regression analysis also did not get a significant association between the presence of comorbidities and the time of presentation. In addition, the type of ACS, awareness about acute coronary syndrome, and absence/presence of chest pain have no association with the presentation based on the findings of this research.

Table 3 determinant of pre hospital delay, Bivariate analysis

	COR	95% LCI	95% UCI	P-value
age in range	1.9	1.2	39.2	0.977
Sex	`1.8	1.02	8.5	0.931
Marital status	1.01	1.001	5.5	0.799
No formal education	1.5	1.2	4.7	0.023*
Primary education	1.02	1.01	16.2	0.45
Collage and university	1.76	1.24	10.7	0.58
Health insurance	2.3	1.79	5.7	0.005*
Awareness about ACS	1.2	1.06	8.2	0.09
Ambulance	0.75	0.67	0.92	0.18
Taxi	1.05	1.02	3.73	0.3
Walking	1.45	1.12	2.57	0.07
With in 5 KM	0.7	0.55	0.84	0.03*
5-10Km	1.03	1.02	15.7	0.09
More than 10Km	1.23	1.13	4.67	0.01*
Sub type of ACS	1.07	1.02	3.21	0.07
Presence of chest pain	1.4	1.15	4.37	0.06

Keys: COR: crude odds ratio. OR: LCI: lower confidence interval: UCI: upper confidence interval

* Means statically significant.

Table 4 determinant of pre hospital delay Multivariate analysis

Variables	AOR	95% LCI	95% UCI	P-value
age in range	1.4	1.1	6.8	0.764
Sex	2.503	4.97	12.597	0.266
Marital status	1.5	1.02	1.9	0.676
No formal education	1.55	1.2	3.1	0.018*
Primary education	5.05	2.98	8.3	0.262
College and university	1.614	1.27	9.466	0.596
Health insurance	3.2	2.67	4.21	0.002*
Awareness about ACS	1.03	1.00	2.29	0.377
Ambulance	0.86	0.23	0.97	0.032*
Taxi	1.674	1.3	16.281	0.657
Walking	1.06	1.03	4.54	0.607
Within 5 KM	0.8	0.53	0.955	0.015*
5-10Km	1.08	1.01	4.5	0.38
More than 10Km	1.7	1.25	4.21	0.004*
Sub type of ACS	1.23	1.08	7.98	0.07
Presence of chest pain	1.207	1.02	5.23	0.75

Keys: AOR: Adjusted odds ratio. OR: LCI: lower confidence interval: UCI: upper confidence interval

* Means statically significant.

6. Discussion

Identifying different socio-demographic and clinical factors responsible for delayed hospital arrival among patients with acute coronary syndrome is very important in guiding diagnosis and treatment. This study has identified different socio-demographic economic and clinical factors that have both direct and indirect effects on timely presentation. Most of the study participants are age of 40 years and above. This showed that age is an important risk factor in coronary artery disease .it has also shown acute coronary syndrome is more predominant in males than females but gender did not significantly affect the time of presentation. This result is against the existing evidence where female sex was associated with delayed hospital arrival (13).

In this study, 57% of the cases presented as delayed which is greater than 12 hours from the onset of symptoms, and the remaining presented as early. The minimum maximum, and average time from the onset of symptoms to the first medical visit were 1 hour,144 hours, and 14.04 hours respectively. The minimum, maximum, and average time from first medical contact to current hospitals were 1,66, and 7 hours respectively. Only 14 patients (11.9%) presented in the first 4 hours after the onset of symptoms while the remaining 88.1% presented after 4 hours. This is very significant when compared to China where the average time of arrival is 4 hours (12). but one research done at Bahir Dar University to see the time of hospital arrival among myocardial infraction, the average time of presentation for ACS patients from the onset of symptoms was 5.83 days (15).

The investigator also tried to look for the clinical profile of ACS patients. Chest pain was the primary complaint in 88 patients (77.9 Diaphoresis was complained in 53 patients (46.5%). Shortness of breath was present in 86 patients (76.1%). The remaining patients who don't have chest pain presented with nausea, vomiting, epigastric pain, and easy fatigability. This finding is in line with one of the previous research projects done in Addis Ababa in 2019 which concluded that 81.7% of the patients presented with chest pain (19). It was also possible to determine the subclasses of ACS in each patient. Most patients (52%) were categorized as ST-elevation myocardial infarction and 32% of the cases were non-ST segment myocardial infarction.

The principal investigator also looked for the complication rates among patients with ACS patients. The overall complication was 30.7%. Acute decompensated heart failure was the most common complication.18 patients had developed ADHF (15.8). Arrhythmia was observed in 8 patients (7%)

The other finding of this research is that the level of education has a significant effect on the time of presentation. A patient who has no formal education tends to present lately compared to a higher level of education p-value of 0.0018, AOR 1.55). This means people with no formal education are 1.55 times more likely to present lately when compared to college and university level educates. This finding is also supported by the large cross-sectional study in China which acknowledges the effect of the level of education at the time of arrival (8).

The presence of health insurance is also a significant contribution to the time of the presentation. Patient who owes health insurance tend to come early to healthcare facilities compared to participants who don't have health insurance (p-value-0.002, AOR 3.2 This is to the cross-

sectional study in China which stated that lack of health insurance is an important risk factor for pre-hospital delay (8)

Another important factors that effect on time of presentation is the relative distance from health facilities. A patient who lives within 5KM from health facilities tends to present timely when compared with distance dwellers (P vale-0.016, AOR 0.8). A patient who lives at a distance greater than `10K tends to present lately compared to those less than 10 (p-value 0.004, AOR 1.7). This shows that distance from health facilities is an important determinant of the time of presentation. This finding is in line with other existing evidence. A large cross-section study from Bangladesh about factors affecting the time of presentation explained that relative distance from the health facilities is a very important determinant in the timely presentation of ACS patients (13).

In this research, it was also tried to see the effect of the mode of transport on the time of presentation. Using an ambulance as a mode of transport is associated with the timely presentation of ACS patients when compared to other means of transport (p-value -0.032, AOR -0.86)

In general, the time of hospital arrival among patients with ACS is affected by different socio-economic, personal, and clinical factors.

7. Limitation

The study period was relatively short which made the sample size relatively small.

No previously available evidence on this topic regarding the magnitude of the problem except one small study in the country side only in the Emergency set up

8. Conclusion

This study has shown that several sociodemographic factors in and around Addis Ababa have a direct effect on the time of presentation among patients with acute coronary syndrome. Level of education, presence of health insurance. Ambulance utilization and rural residence have both direct and indirect effects on delayed hospital arrival. The overall awareness about acute coronary syndrome is very low among the participants. The majority of the participants did not have any ambulate phone numbers. The mode of transport for the primary visit and to the referral hospitals was mostly public transportation. The level of prehospital service is significantly low evidenced by the low level of ambulance utilization and absence of prehospital anti-ischemic medication administration. To address this challenge and improve patient outcomes, implementing comprehensive public health campaigns to educate the population about ACS symptoms, risk factors and the importance of timely presentation is necessary. Enhancing emergency medical service particularly in rural areas to ensure prompt transportation of patients to health facilities should be considered

9. Recommendations

Improving community awareness about the signs and symptoms of ACS is very necessary, as is emphasizing the importance of seeking early medical assistance. Pre-hospital care should be enhanced as it is very crucial to ensure timely presentation and intervention. Furthermore, providing training on early recognition of acute coronary syndrome symptoms as well as the timely administration of appropriate medication can save lives. Ambulance utilization is also an important area that needs improvement so raising awareness should be done. Lastly addressing socioeconomic disparities by implementing affordable systems is necessary.

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ANNEXS

Section 1. Consent form

I am Dr. Aklilu Belay, a third-year resident at Addis Ababa University, Tikur Anbessa Specialized Hospital, Emergency and Critical care Medicine department. As for the partial fulfilment of the academic year, I am doing this research on Factors associated with delayed hospital arrival among patients with acute coronary syndrome in Addis Ababa, Ethiopia.

I would appreciate you in giving your time to give me the information I need as it is important for me to understand my research question. This will only be used for educational purposes and your identity will be kept confidential.

Persons to contact for further information: If you have any questions, you can contact the principal investigator at the following address:

Dr. Aklilu Belay

Phone +251912726462

Email: aklilu725@gmail.com

Contact information for complaint: If you have any concern that the research team is conducting their activities unethically or inappropriately, please contact Addis Ababa University, college of health sciences at the following address:

Email: health.sciences@aau.edu.et

Are you willing to participate in this study?

……..…Yes □ No

Section 2: socio demographic data

1.Patient ID/ Code: …

2.Age in…….

3.Gender …….. Male …….. Female

4.Address by region.

- Addis Ababa
- Oromia
- Amhara
- Afar
- Tigray
- Somali
- Sidamo
- South west
- Central Ethiopia
- Gambelia
- Benishangul gumuz

5.Marital status Single

- Married
- Divorced
- Widowed
- Separated

6. Occupation

- Government employer
- Private worker
- Student
- House wife
- Unemployed
- Retired
- Other (please specify……

7.hightes level of education

- No formal education
- Primary education

- Secondary education
- Collage level education
- University level

8.Do you have health insurance? or TENA MEDHN

- Yes
- No

9.if yes ,is the insurance cover all health expenses which found at respective hospitals?

- Yes
- No

10.if there are exception which is health insurance will not cover, please specify below?

…….

……..

……..

11.If there is no health insurance, how is the health expense being covered?

- Pocket money
- Borrowed from someone
- Through hospitals social service

12.. Currently being treated at which hospital?

- Tikur Anbessa
- Zewditu memorial hospital
- St paul hospital millennium medical collage
- St peter hospital

13.Date of admission …….

Section 3: pre hospital service

1.Where did you first go for your current illness?

- Health center
- Private clinic
- Other hospital
- Directly came to this hospital

2.was there any medication given before reaching to first medical contact?

……..……□ Yes □ No

3.if yes, please specify

……..

4.what was the time taken from the onset of symptoms to first medical service or health center

Specify in hours …….

5.did, you receive any medication at health center or private clinic?

…….……□ Yes □ No

6.if yes. please specify

……..

7.what was the time taken from the first medical visit to current hospital arrival?

Specify in hours …….

8. why do you think it took that long to go to hospital?

Fear or denial

- Misinterpretation of symptoms
- Lack of Campanians
- Financial constraint
- Geographic factors

9. do you know any government ambulance phone number?

…….……□ Yes □ No

10.do you know any private ambulance phone number?

…….……□ Yes □ No

11. if the answer is yes for one of the above questions? Did you call ambulance?

…….……□ Yes □ No

12.if yes for question number 13, did the ambulance came?

…….……□ Yes □ No

13.if ambulance came. what was the time taken to show up?

Specify……

14. what was the mode of arrival to hospital?

- Ambulance
- Taxi
- Walking

- Private car

15.Average distance of residency from health facility?

- < 5km
- 5-10km
- Greater than 10km

Section 4: past medical Illness

1 Comorbidity

- Hypertension……..……□ Yes □ No
- Diabetes mellitus…… …….……□ Yes □ No
- Hyperlipidemia……..…□ Yes □ No
- Chronic kidney disease…….……□ Yes □ No
- COPD……□ Yes □ No

2.**past medical illness**

- Ischemic heart disease…….……□ Yes □ No
- Previous myocardial infarction…….……□ Yes □ No
- Heart failure…….……...…□ Yes □ No
- Stroke…….……... …□ Yes □ No
- Peripheral artery disease…….……□ Yes □ No
- Valvular heart disease…….……□ Yes □ No
- Other ……
- None

Section 5: Clinical presentation of acute coronary syndrome

1. when was the symptom started?

- During day time
- During night time

2. chest pain …….……□ Yes □ No

3.if yes, please specify

- Location…….
- Radiation……
- Duration……...
- Aggravating and relieving factor …….

4.Dispepsia ……. ….. ……□ Yes □ No

5. Sweating /diaphoresis……..……□ Yes □ No

6. Nausea and vomiting ……..……□ Yes □ No

7.easy fatigability ……..…□ Yes □ No

9.other, please specify …….

Final diagnosis

- STEMI
- NSTEMI
- Unstable Angina

Section 6: management

1.medical management

- Aspirin ……..……□ Yes □ No
- Clopidogrel ……. ……..……□ Yes □ No
- Statins……..……□ Yes □ No
- Nitrates …… ……□ Yes □ No
- Anticoagulation…… ……..……□ Yes □ No
- Beta blockers ……..……□ Yes □ No
- Morphine……..…□ Yes □ No
- ACE inhibitors……..……□ Yes □ No

2.Reperfusion therapy

Do you Received reperfusion therapy ?…….……□ Yes □ No

If yes. which one do you receive

- Thrombolytics
- PCI
- CABG

Section 6: Major complication at Hospital

- CHF ……..…□ Yes □ No
- Re-infraction……..…□ Yes □ No
- Arrhythmia ……. …. □ Yes □ No
- If yes, please specify the type…….

- Bleeding ……..……□ Yes □ No
- Stroke ……□ Yes □ No
- Discharge alive..……..……□ Yes □ No