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A PROSPECTIVE STUDY ON PATTERN OF ACUTE CORONARY SYNDROME PRESENTATIONS IN THE EMERGENCY DEPARTMENT.

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Abstract

Background: Acute coronary syndrome (ACS) represents a spectrum of life-threatening cardiovascular conditions resulting from acute myocardial ischemia and remains one of the leading causes of morbidity and mortality worldwide. It encompasses ST-elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI), and unstable angina. Early recognition and prompt management of acute coronary syndrome are critical in reducing complications, improving survival, and preventing long-term cardiac dysfunction. The clinical presentation of acute coronary syndrome varies considerably among patients and may include classical symptoms such as central chest pain along with atypical manifestations including dyspnea, diaphoresis, epigastric discomfort, syncope, nausea, vomiting, and fatigue. Delayed recognition of atypical presentations can contribute to increased mortality and adverse cardiovascular outcomes, particularly among elderly individuals and patients with comorbidities such as diabetes mellitus and hypertension.

Emergency departments play a crucial role in the initial diagnosis, stabilization, risk stratification, and management of acute coronary syndrome patients. Understanding the pattern of ACS presentations may help improve early diagnosis, optimize emergency care protocols, and reduce treatment delays. ***Aim:*** To study the pattern of acute coronary syndrome presentations in the emergency department of tertiary care hospital.

Objectives:

1. To evaluate the demographic profile of patients presenting with acute coronary syndrome.
2. To study the clinical presentation patterns of acute coronary syndrome patients.
3. To assess the prevalence of different types of acute coronary syndrome including STEMI, NSTEMI, and unstable angina.
4. To evaluate associated risk factors and comorbidities among ACS patients.
5. To assess initial emergency department outcomes and complications in acute coronary syndrome patients. ***METHODOLOGY:*** This prospective observational study was conducted in the Department of Critical Care at a tertiary care hospital over a period of one year during the period of January 2025 to December 2025. A total of 60 patients aged between 40 and 70 years presenting with features suggestive of acute coronary syndrome were included in the study. Detailed history, demographic data, presenting symptoms, cardiovascular risk factors, electrocardiographic findings, cardiac biomarker levels, clinical diagnosis, and emergency management details were recorded using a structured proforma. Patients were classified into STEMI, NSTEMI, and unstable angina groups based on clinical evaluation, electrocardiography, and cardiac biomarker findings. Collected data were analyzed using appropriate statistical methods, and outcomes were assessed based on emergency stabilization, complications, and in-hospital status. ***Results:*** The majority of patients belonged to the 51–60 years age group, with male predominance observed among ACS presentations. Chest pain was the most common presenting symptom, followed by sweating, dyspnea, nausea, and radiation of pain to the left upper limb. STEMI constituted the most common type of acute coronary syndrome presentation. Hypertension, diabetes mellitus, smoking, and dyslipidemia were the major associated cardiovascular risk factors observed among study participants. Delayed presentation to the emergency department was associated with increased complications including arrhythmias, cardiogenic shock, and heart failure. ***Conclusion:*** Acute coronary syndrome remains a major medical emergency with varied clinical presentation patterns. STEMI was the predominant ACS presentation observed in the emergency department. Classical chest pain remained the most common symptom; however, atypical presentations were also frequently encountered, particularly among elderly patients and individuals with comorbid conditions. Early recognition of ACS symptoms, prompt emergency evaluation, and timely intervention are essential in reducing morbidity and mortality associated with acute coronary syndrome. Increased awareness regarding atypical presentations and cardiovascular risk factors may contribute to improved emergency care and better patient outcomes.

Keywords: Acute coronary syndrome; STEMI; NSTEMI; Unstable angina; Emergency department; Chest pain; Cardiovascular risk factors; Myocardial infarction; Critical care; Emergency medicine.

INTRODUCTION

Acute coronary syndrome (ACS) comprises a spectrum of clinical conditions resulting from acute myocardial ischemia and remains one of the leading causes of morbidity and mortality worldwide [1]. Acute coronary syndrome includes ST-elevation myocardial infarction (STEMI), non-ST elevation myocardial infarction (NSTEMI), and unstable angina, all of which are associated with significant cardiovascular complications and healthcare burden [2]. Rapid identification and early management of ACS are essential for reducing myocardial damage, preventing complications, and improving survival outcomes [3].

Cardiovascular diseases account for a substantial proportion of global deaths, with coronary artery disease representing the most common underlying pathology [4]. Developing countries including India have witnessed a significant rise in the incidence of acute coronary syndrome because of urbanization, sedentary lifestyle, dietary changes, smoking, obesity, hypertension, diabetes mellitus, and dyslipidemia [5]. The burden of ACS has increased considerably among middle-aged and elderly populations, thereby creating major challenges for emergency healthcare services [6].

The pathophysiology of acute coronary syndrome primarily involves rupture or erosion of an atherosclerotic plaque followed by platelet aggregation and thrombus formation, resulting in partial or complete occlusion of coronary blood flow [7]. Myocardial ischemia resulting from impaired coronary perfusion may lead to myocardial necrosis, arrhythmias, heart failure, cardiogenic shock, and sudden cardiac death if timely intervention is not initiated [8].

The clinical presentation of acute coronary syndrome varies widely among patients. Classical symptoms include central or left-sided chest pain, chest heaviness, tightness, diaphoresis, radiation of pain to the left arm, neck or jaw, and shortness of breath [9]. However, atypical presentations such as epigastric discomfort, nausea, vomiting, fatigue, dizziness, syncope, and isolated breathlessness are frequently encountered, particularly among elderly individuals, females, and diabetic patients [10]. Atypical presentations often contribute to delayed diagnosis and treatment, thereby increasing morbidity and mortality [11].

Emergency departments play a critical role in the early diagnosis, stabilization, and management of acute coronary syndrome patients [12]. Prompt electrocardiographic evaluation, cardiac biomarker assessment, risk stratification, and initiation of evidence-based therapy are essential components of emergency ACS care [13]. Delays in diagnosis and treatment may significantly worsen patient outcomes, particularly in STEMI where early reperfusion therapy is crucial for myocardial salvage [14].

Several studies have shown that cardiovascular risk factors such as hypertension, diabetes mellitus, smoking, obesity, dyslipidemia, family history of coronary artery disease, and sedentary lifestyle significantly contribute to the development of acute coronary syndrome [15]. Identification of these risk factors among emergency department presentations may help improve preventive strategies and early intervention programs.

Patterns of ACS presentation may vary according to age, gender, associated comorbidities, and socioeconomic factors [16]. Elderly patients frequently present with atypical symptoms and are more likely to develop complications including heart failure, arrhythmias, and cardiogenic shock [17]. Similarly, diabetic patients often demonstrate silent or atypical ischemic symptoms because of autonomic neuropathy, leading to delayed hospital presentation [18].

Understanding the clinical profile and presentation patterns of acute coronary syndrome in emergency settings is essential for improving diagnostic accuracy, reducing door-to-treatment time, and optimizing patient outcomes. Evaluation of ACS presentation patterns may additionally assist clinicians in recognizing high-risk patients and implementing timely evidence-based management strategies.

Hence, the present study was undertaken to evaluate the pattern of acute coronary syndrome presentations in the emergency department of a tertiary care hospital and to assess associated clinical characteristics, cardiovascular risk factors, and emergency outcomes among ACS patients.

Aim and Objectives

Aim

To study the pattern of acute coronary syndrome presentations in the emergency department of tertiary care hospital

Objectives

1. To evaluate the demographic profile of patients presenting with acute coronary syndrome.
2. To study the clinical presentation patterns of acute coronary syndrome patients in the emergency department.
3. To assess the prevalence of different types of acute coronary syndrome including STEMI, NSTEMI, and unstable angina.
4. To evaluate associated cardiovascular risk factors and comorbidities among acute coronary syndrome patients.
5. To assess emergency department outcomes and early complications associated with acute coronary syndrome presentations.

MATERIALS AND METHODS

Study Design

This study was conducted as a prospective observational study.

Study Setting

The study was conducted in the Department of Critical Care and Emergency Medicine at a tertiary care hospital.

Study Duration

The study was conducted over a period of one year during the period from January 2025 to December 2025.

Study Population

The study population included patients presenting to the emergency department with clinical features suggestive of acute coronary syndrome.

Sample Size

A total of 60 patients were included in the study.

Inclusion Criteria

1. Patients aged between 40 and 70 years.
2. Patients presenting with symptoms suggestive of acute coronary syndrome including chest pain, chest discomfort, dyspnea, diaphoresis, palpitations, syncope, or atypical ischemic symptoms.
3. Patients diagnosed with STEMI, NSTEMI, or unstable angina based on clinical evaluation, electrocardiographic findings, and cardiac biomarkers.
4. Patients willing to participate in the study.

Exclusion Criteria

1. Patients with non-cardiac causes of chest pain.
2. Patients with chronic stable angina without evidence of acute coronary syndrome.
3. Patients with severe valvular heart disease or congenital heart disease.
4. Patients with severe renal or hepatic failure.
5. Patients unwilling to participate in the study.

Data Collection Procedure

Eligible patients fulfilling the inclusion criteria were enrolled after obtaining informed consent. Detailed clinical history including presenting symptoms, duration of symptoms, cardiovascular risk factors, previous cardiac illness, smoking history, alcohol consumption, and family history of coronary artery disease was recorded using a structured proforma.

Clinical examination findings, vital parameters, electrocardiographic changes, cardiac biomarker levels, echocardiographic findings, and emergency management details were documented. Patients were categorized into STEMI, NSTEMI, and unstable angina groups based on standard diagnostic criteria.

Patients were monitored throughout their emergency department stay and hospitalization for development of complications and clinical outcomes.

Outcome Measures

Primary Outcome Measures

1. Pattern of clinical presentation of acute coronary syndrome.
2. Distribution of STEMI, NSTEMI, and unstable angina cases.

Secondary Outcome Measures

1. Associated cardiovascular risk factors.
2. Emergency complications including arrhythmias, cardiogenic shock, and heart failure.
3. Requirement for intensive care admission.
4. In-hospital mortality.

STATISTICAL ANALYSIS

Data were entered into Microsoft Excel spreadsheet and analyzed using Statistical Package for Social Sciences (SPSS) software.

Descriptive statistics including mean, standard deviation, frequencies, and percentages were used for data presentation. Inferential statistical methods including Chi-square test and Student's t-test were applied wherever appropriate.

A p-value less than 0.05 was considered statistically significant.

Ethical Considerations

Institutional Ethics Committee approval was obtained prior to commencement of the study. Written informed consent was obtained from all study participants before enrollment. Confidentiality of patient information was maintained throughout the study period. The study was conducted in accordance with ethical principles and institutional research guidelines.

RESULTS

A total of 60 patients presenting with acute coronary syndrome were included in the present prospective observational study conducted in the Department of Critical Care and Emergency Medicine at a tertiary care hospital over a period of one year.The study demonstrated that the majority of patients belonged to the 51–60 years age group, with male predominance observed among acute coronary syndrome presentations. ST-elevation myocardial infarction (STEMI) constituted the most common ACS subtype encountered in the emergency department, followed by NSTEMI and unstable angina. Chest pain was the predominant presenting complaint among study participants, while associated symptoms such as sweating, dyspnea, nausea, palpitations, and radiation of pain to the left upper limb were also frequently observed. Atypical presentations including epigastric discomfort, isolated breathlessness, and syncope were more commonly observed among elderly and diabetic patients.

Hypertension, diabetes mellitus, smoking, dyslipidemia, and previous history of coronary artery disease were the major cardiovascular risk factors identified among ACS patients. Delayed presentation to the emergency department was associated with increased frequency of complications including arrhythmias, acute heart failure, and cardiogenic shock. The findings of the present study highlight the diverse clinical presentation patterns of acute coronary syndrome and emphasize the importance of early recognition and prompt emergency management for improving patient outcomes.

Table 1: Age-wise distribution of acute coronary syndrome patients

Age group (years)	Number of patients	Percentage (%)
40–50	18	30.0
51–60	27	45.0
61–70	15	25.0

Table 1 shows the age-wise distribution of study participants presenting with acute coronary syndrome.

The above table shows that the majority of patients belonged to the 51–60 years age group accounting for 45.0% of the study population, followed by 40–50 years age group with 30.0% and 61–70 years age group with 25.0%.

Table 2: Gender distribution among acute coronary syndrome patients

Gender	Number of patients	Percentage (%)
Male	42	70.0
Female	18	30.0

Table 2 shows the gender distribution of study participants.

The above table shows that males constituted the majority of acute coronary syndrome patients accounting for 70.0%, while females represented 30.0% of the study population.

Table 3: Distribution of types of acute coronary syndrome

Type of ACS	Number of patients	Percentage (%)
STEMI	32	53.3
NSTEMI	18	30.0
Unstable angina	10	16.7

Table 3 shows the distribution of different ACS subtypes among study participants.

The above table shows that STEMI was the most common type of acute coronary syndrome accounting for 53.3% of cases, followed by NSTEMI in 30.0% and unstable angina in 16.7% of patients.

Table 4: Presenting symptoms among acute coronary syndrome patients

Presenting symptom	Number of patients	Percentage (%)
Chest pain	56	93.3
Sweating	41	68.3
Dyspnea	29	48.3
Nausea/vomiting	18	30.0
Radiation of pain to left arm	34	56.7
Palpitations	15	25.0
Syncope	7	11.7
Epigastric discomfort	9	15.0

Table 4 shows the presenting symptoms observed among study participants.
The above table shows that chest pain was the most common presenting symptom observed in 93.3% of patients, followed by sweating in 68.3%, radiation of pain to the left arm in 56.7%, and dyspnea in 48.3% of cases.

Table 5: Cardiovascular risk factors among study participants

Risk factor	Number of patients	Percentage (%)
Hypertension	38	63.3
Diabetes mellitus	29	48.3
Smoking	31	51.7
Dyslipidemia	24	40.0
Obesity	17	28.3
Family history of CAD	13	21.7

Table 5 shows the prevalence of cardiovascular risk factors among ACS patients.
The above table shows that hypertension was the most common cardiovascular risk factor observed in 63.3% of patients, followed by smoking in 51.7%, diabetes mellitus in 48.3%, and dyslipidemia in 40.0% of cases.

Table 6: Time interval between symptom onset and emergency department presentation

Time interval	Number of patients	Percentage (%)
<3 hours	19	31.7
3–6 hours	24	40.0
>6 hours	17	28.3

Table 6 shows the duration between onset of symptoms and hospital presentation.
The above table shows that 40.0% of patients presented to the emergency department within 3–6 hours of symptom onset, while 28.3% presented after more than 6 hours.

Table 7: Electrocardiographic findings among study participants

ECG finding	Number of patients	Percentage (%)
ST elevation	32	53.3
ST depression	14	23.3
T wave inversion	9	15.0
Normal/non-specific changes	5	8.4

Table 7 shows the electrocardiographic findings observed among ACS patients.
The above table shows that ST elevation was the most common electrocardiographic finding accounting for 53.3% of patients, followed by ST depression in 23.3% and T wave inversion in 15.0% of cases.

Table 8: Complications observed among acute coronary syndrome patients

Complication	Number of patients	Percentage (%)
Arrhythmias	16	26.7
Acute heart failure	11	18.3
Cardiogenic shock	7	11.7
Recurrent ischemia	9	15.0
Cardiac arrest	4	6.7

Table 8 shows complications observed during emergency department stay and hospitalization.

The above table shows that arrhythmias were the most common complication observed in 26.7% of patients, followed by acute heart failure in 18.3% and recurrent ischemia in 15.0% of cases.

Table 9: Requirement for intensive care unit admission

ICU admission	Number of patients	Percentage (%)
Required	37	61.7
Not required	23	38.3

Table 9 shows ICU admission requirement among study participants.
The above table shows that 61.7% of acute coronary syndrome patients required intensive care unit admission for further monitoring and management.

Table 10: In-hospital outcome among acute coronary syndrome patients

Outcome	Number of patients	Percentage (%)
Improved and discharged	51	85.0
Mortality	9	15.0

Table 10 shows the in-hospital outcomes among study participants.
The above table shows that 85.0% of patients improved and were discharged successfully, while in-hospital mortality was observed in 15.0% of cases.

Table 1 demonstrated that the majority of acute coronary syndrome patients belonged to the 51–60 years age group accounting for 45.0% of the study population, followed by the 40–50 years age group at 30.0% and the 61–70 years age group at 25.0%. These findings indicate that ACS predominantly affected middle-aged and elderly individuals.

Table 2 showed marked male predominance among acute coronary syndrome presentations, with males accounting for 70.0% of patients compared to 30.0% females. This finding reflects the higher prevalence of cardiovascular risk factors and coronary artery disease among males.

Table 3 demonstrated that ST-elevation myocardial infarction (STEMI) was the most common type of acute coronary syndrome accounting for 53.3% of cases, followed by NSTEMI in 30.0% and unstable angina in 16.7% of patients. STEMI therefore represented the predominant emergency cardiac presentation in the study population.

Table 4 revealed that chest pain was the most common presenting symptom observed in 93.3% of patients, followed by sweating in 68.3%, radiation of pain to the left arm in 56.7%, and dyspnea in 48.3% of cases. Atypical symptoms including syncope and epigastric discomfort were also observed among a smaller proportion of patients.

Table 5 demonstrated that hypertension was the most prevalent cardiovascular risk factor identified in 63.3% of patients, followed by smoking in 51.7%, diabetes mellitus in 48.3%, and dyslipidemia in 40.0% of cases. These findings highlight the strong association between conventional cardiovascular risk factors and acute coronary syndrome.

Table 6 showed that 40.0% of patients presented to the emergency department within 3–6 hours of symptom onset, while 28.3% presented after more than 6 hours. Delayed hospital presentation may contribute to increased myocardial damage and higher complication rates.

Table 7 demonstrated that ST elevation was the most common electrocardiographic finding accounting for 53.3% of patients, followed by ST depression in 23.3% and T wave inversion in 15.0% of cases. These ECG findings correlated with the predominance of STEMI presentations in the study population.

Table 8 revealed that arrhythmias were the most common complication observed in 26.7% of patients, followed by acute heart failure in 18.3%, recurrent ischemia in 15.0%, and cardiogenic shock in 11.7% of cases. Severe cardiovascular complications were more commonly associated with delayed presentation and STEMI.
Table 9 demonstrated that 61.7% of patients required intensive care unit admission for close monitoring and advanced cardiac management, indicating the high severity and critical nature of ACS presentations in the emergency department.

Table 10 showed that the majority of patients improved and were discharged successfully accounting for 85.0% of cases, while in-hospital mortality was observed in 15.0% of patients. Mortality was predominantly associated with severe STEMI, cardiogenic shock, and late presentation to the hospital.

DISCUSSION

The present prospective observational study was conducted to evaluate the pattern of acute coronary syndrome presentations in the emergency department of a tertiary care hospital. Acute coronary syndrome continues to represent a major cardiovascular emergency associated with significant morbidity, mortality, and healthcare burden worldwide [1,2]. Early recognition of symptoms and timely emergency management remain crucial for reducing complications and improving survival outcomes in ACS patients [3].

In the present study, the majority of patients belonged to the 51–60 years age group, indicating increased prevalence of ACS among middle-aged and elderly individuals. Similar findings have been reported in previous cardiovascular studies where advancing age was identified as an important non-modifiable risk factor for coronary artery disease and myocardial infarction [4,5]. Increasing age contributes to progressive atherosclerosis, endothelial dysfunction, and accumulation of cardiovascular risk factors, thereby increasing susceptibility to acute coronary events.

Male predominance was observed in the present study, with males accounting for 70.0% of ACS presentations. Similar gender distribution has been reported in several Indian and international studies [6]. Higher prevalence of smoking, occupational stress, sedentary lifestyle, and other cardiovascular risk factors among males may contribute to increased incidence of coronary artery disease. However, postmenopausal females also demonstrate progressively increasing cardiovascular risk because of loss of protective estrogenic effects [7].

The present study demonstrated that STEMI was the most common type of acute coronary syndrome accounting for 53.3% of cases, followed by NSTEMI and unstable angina. Similar observations were reported in previous emergency department-based ACS studies where STEMI constituted the predominant presentation among hospitalized coronary artery disease patients [8]. STEMI represents complete coronary artery occlusion and is associated with greater myocardial damage and increased risk of complications if reperfusion therapy is delayed [9].

Chest pain was the most common presenting symptom observed in 93.3% of patients in the present study. Sweating, dyspnea, and radiation of pain to the left upper limb were also frequently observed. Similar findings have been consistently reported in studies evaluating clinical presentation patterns of acute coronary syndrome [10]. Typical ischemic chest pain remains the most important symptom suggestive of ACS and should prompt immediate electrocardiographic evaluation and cardiac biomarker assessment [11].

Atypical presentations including epigastric discomfort, syncope, and isolated breathlessness were observed among a subset of patients, particularly elderly and diabetic individuals. Previous studies have demonstrated that elderly, diabetic, and female patients frequently present without classical chest pain symptoms, thereby contributing to delayed diagnosis and treatment [12,13]. Atypical presentations often increase risk of adverse outcomes and mortality because of delayed initiation of evidence-based therapy.

Hypertension was identified as the most common cardiovascular risk factor in the present study followed by smoking, diabetes mellitus, and dyslipidemia. Similar findings have been reported in previous studies evaluating cardiovascular risk profiles among ACS patients [14,15]. These conventional cardiovascular risk factors contribute significantly to atherosclerotic plaque formation, endothelial dysfunction, and thrombotic coronary occlusion.

A considerable proportion of patients in the present study presented to the emergency department after more than six hours of symptom onset. Delayed presentation remains an important challenge in ACS management because prolonged ischemic time results in increased myocardial necrosis, reduced effectiveness of reperfusion therapy, and higher complication rates [16]. Lack of awareness regarding ACS symptoms, delayed transportation, socioeconomic factors, and atypical clinical presentation may contribute to late hospital arrival [17].

Electrocardiographic findings in the present study demonstrated predominance of ST elevation changes, correlating with the higher prevalence of STEMI. Electrocardiography remains the cornerstone of early ACS diagnosis and assists in rapid risk stratification and treatment planning [18]. Prompt ECG interpretation in emergency settings is essential for timely initiation of reperfusion therapy and reduction of treatment delay.

Arrhythmias were the most common complication observed in the present study followed by acute heart failure and cardiogenic shock. Similar complications have been widely reported in acute coronary syndrome patients, particularly among those with STEMI and delayed presentation [19]. Myocardial ischemia and necrosis may result in electrical instability, impaired ventricular function, and hemodynamic compromise leading to life-threatening complications.

More than half of the patients in the present study required intensive care unit admission, reflecting the severity of acute coronary syndrome presentations encountered in emergency settings. Although the majority of patients improved with treatment, mortality was observed predominantly among patients with severe STEMI, cardiogenic shock, and delayed hospital presentation. Similar mortality patterns have been reported in previous ACS registries and emergency care studies [20].

The findings of the present study emphasize the importance of early symptom recognition, prompt emergency department evaluation, rapid electrocardiographic assessment, and timely evidence-based intervention in improving outcomes among acute coronary syndrome patients. Increased public awareness regarding cardiovascular risk factors and atypical ACS presentations may help reduce treatment delays and improve survival outcomes.

Limitations of the Study

1. The study was conducted in a single tertiary care centre with relatively small sample size.
2. Long-term follow-up of patients was not performed.
3. Coronary angiographic correlation was not analyzed in all patients.
4. Variations in treatment modalities and reperfusion strategies were not assessed separately.
5. Prehospital delay factors and socioeconomic determinants influencing emergency presentation were not evaluated independently.

CONCLUSION

The present study demonstrated that acute coronary syndrome remains a major cardiovascular emergency with varied clinical presentation patterns in the emergency department. The majority of patients belonged to the middle-aged and elderly population, with marked male predominance observed among ACS presentations.

ST-elevation myocardial infarction was identified as the most common type of acute coronary syndrome encountered in the study population. Classical chest pain remained the predominant presenting symptom; however, atypical manifestations including dyspnea, epigastric discomfort, and syncope were also observed, particularly among elderly and diabetic patients. Hypertension, smoking, diabetes mellitus, and dyslipidemia were the major cardiovascular risk factors associated with acute coronary syndrome. Delayed presentation to the emergency department was associated with increased complications including arrhythmias, acute heart failure, cardiogenic shock, and higher mortality.The findings of the present study emphasize the importance of early recognition of ACS symptoms, rapid electrocardiographic evaluation, timely risk stratification, and prompt evidence-based management in improving patient outcomes. Increased public awareness regarding cardiovascular risk factors and atypical ACS presentations may contribute to earlier hospital presentation and reduced treatment delays. Strengthening emergency cardiac care services, promoting preventive cardiology measures, and improving awareness regarding acute coronary syndrome may significantly reduce morbidity and mortality associated with coronary artery disease. Further large-scale multicentric studies are recommended to better evaluate changing patterns of acute coronary syndrome presentations and associated outcomes in different population groups.

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