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RESEARCH ARTICLE

Frequency and Clinical Profile of Acute Coronary Syndrome among Patients Presenting with Chest Pain

Fahim Khan Mukarram[1], Samir Kumar Kundu[2], Lima Asrin Sayami[3], Syed Harun Or Rashid[4], A B M Riaz Kawser[5], Md. Saiful Islam[6], Arjun Ghosh[7]

[1]Junior Consultant, Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.
[2]Professor, Department of Cardiology (C.C), National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.
[3]Associate Professor, Department of Cardiology (C.C), National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.
[4]Assistant Professor, Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.
[5]Assistant Professor, Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.
[6]Medical Officer, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.
[7]Medical Officer, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.

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Corresponding Author: Fahim Khan Mukarram, Junior Consultant, Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh.

Abstract

Background: Chest pain is one of the most common presenting complaints in emergency departments, with acute coronary syndrome (ACS) being a leading cause. Early recognition is essential for timely intervention and reduction of morbidity and mortality.

Objective: To determine the prevalence of acute coronary syndrome among patients presenting with chest pain.

Methods: This cross-sectional study was conducted among 200 consecutive adult patients presenting with acute chest pain to the emergency department of a tertiary care hospital. Demographic details, risk factors, clinical features, electrocardiography, and cardiac biomarkers were analyzed. ACS was diagnosed according to standard criteria into ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI), and unstable angina (UA).

Results: Out of 200 patients with chest pain, 82 (41%) were diagnosed with ACS. Among them, 34 (41.5%) had STEMI, 28 (34.1%) had NSTEMI, and 20 (24.4%) had unstable angina. The mean age of ACS patients was 57.3 ± 11.2 years; 68.3% were male. Hypertension (56%), diabetes mellitus (38%), smoking (44%), and dyslipidemia (32%) were the major associated risk factors. Non-ACS chest pain (59%) was mainly due to musculoskeletal, gastrointestinal, or pulmonary causes.

Conclusion: The prevalence of ACS among patients presenting with chest pain was 41%. Cardiovascular risk factors such as hypertension, smoking, and diabetes were strongly associated. Early identification of ACS in chest pain patients remains vital for reducing morbidity and mortality.

Keywords: Acute Coronary Syndrome, Chest Pain, Prevalence, STEMI, NSTEMI, Unstable Angina.

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1. Introduction

Chest pain is one of the most frequent reasons for emergency hospital visits worldwide. Among its many causes, acute coronary syndrome (ACS) remains the most life-threatening and clinically significant condition. ACS encompasses a spectrum of clinical disorders including ST-elevation myocardial infarction (STEMI), non-ST-elevation myocardial infarction (NSTEMI), and unstable angina (UA), all of which result from acute obstruction of coronary blood flow due to plaque rupture or thrombosis [1]. Globally, cardiovascular disease is the leading cause of mortality, accounting for approximately 17.9 million deaths annually, with ACS representing a major share [2]. In South Asia, including Bangladesh, the burden of coronary artery disease is rising rapidly due to increasing prevalence of traditional risk factors such as hypertension, diabetes, smoking, and sedentary lifestyle [3,4]. Multiple studies across different countries have reported a varying prevalence of ACS among chest pain patients, ranging from 20% to 45% [5,6]. Accurate data on the prevalence of ACS in emergency settings is crucial for appropriate resource allocation, early diagnosis, and timely management. However, there is a paucity of local studies in this field, particularly in Bangladesh and similar low-middle income countries. The present study aims to determine the prevalence of ACS among patients presenting with chest pain in a tertiary care hospital, and to identify common risk factors associated with ACS in this population.

2. Materials and Methods

2.1 Study Design & Setting

This cross-sectional observational study was conducted in the Department of Cardiology, National Institute of Cardiovascular Diseases (NICVD), Dhaka, Bangladesh from June, 2023 to May, 2024, over a period of 12 months.

2.2 Sample Size

A total of 200 consecutive patients aged ≥18 years presenting with acute chest pain were included.

2.3 Inclusion Criteria

- Patients with acute chest pain (≤24 hours).
- Age ≥18 years.

2.4 Exclusion Criteria

- Chest pain due to trauma, known gastrointestinal, musculoskeletal, or pulmonary causes confirmed at presentation.
- Patients refusing consent.

2.5 Diagnosis of ACS

- ***STEMI:*** New ST-segment elevation in ≥2 contiguous ECG leads plus elevated troponin.
- ***NSTEMI:*** Elevated troponin without ST-elevation on ECG.
- ***Unstable Angina:*** Angina at rest with dynamic ECG changes but no troponin elevation.

2.6 Data Collection

Demographic variables, risk factors (hypertension, diabetes, smoking, dyslipidemia, obesity, family history), comorbidities, ECG findings, troponin levels, and echocardiography results were recorded.

2.7 Statistical Analysis

Data were analyzed using descriptive statistics. Prevalence of ACS was calculated as a percentage.

3. Results

A total of 200 patients presenting with chest pain were enrolled in this study. The age of the participants ranged from 22 to 85 years, with a mean age of 55.8 ± 12.6 years. Males constituted 124 (62%) and females 76 (38%) of the study population.

3.1 Prevalence of ACS

Out of 200 patients, 82 (41%) were diagnosed with acute coronary syndrome (ACS), while 118 (59%) had non-ACS causes of chest pain.

Table 1. *Prevalence of ACS among chest pain patients (N = 200)*

Diagnosis	Frequency (n)	Percentage (%)
ACS	82	41%
Non-ACS	118	59%
Total	**200**	**100%**

Table-1 showing distribution of ACS and non-ACS cases. A larger portion (59%) represents non-ACS causes of chest pain, while 41% represents ACS.

3.2 Distribution of ACS Subtypes

Among the 82 ACS patients, STEMI was the most common presentation (34, 41.5%), followed by NSTEMI (28, 34.1%), and unstable angina (20, 24.4%).

Table 2. *Distribution of ACS subtypes (n = 82)*

Subtype	Frequency (n)	Percentage of ACS (%)
STEMI	34	41.5%
NSTEMI	28	34.1%
Unstable Angina	20	24.4%
Total	**82**	**100%**

Table-2 showing frequency of ACS subtypes – highest for STEMI (41.5%), followed by NSTEMI (34.1%) and unstable angina (24.4%).

3.3 Demographic Characteristics of ACS Patients

The mean age of ACS patients was 57.3 ± 11.2 years. Out of 82 ACS cases, 56 (68.3%) were male and 26 (31.7%) female.

Table 3. *Demographic profile of ACS patients (n = 82)*

Variable	Number (n)	Percentage (%)
Mean Age	57.3 ± 11.2 years	—
Male	56	68.3%
Female	26	31.7%

Table-3 showing age distribution of ACS cases, with peak prevalence in the 51–60 years age group, followed by 61–70 years. Male predominance is evident across all age groups.

3.4 Risk Factors among ACS Patients

Hypertension was the most common risk factor (56%), followed by smoking (44%), diabetes mellitus (38%), and dyslipidemia (32%). Obesity was observed in 22% and a positive family history of premature coronary artery disease in 15%.

Table 4. *Risk factors among ACS patients (n = 82)*

Risk Factor	Frequency (n)	Percentage (%)
Hypertension	46	56%
Smoking	36	44%
Diabetes Mellitus	31	38%
Dyslipidemia	26	32%
Obesity	18	22%
Family history of CAD	12	15%

Table-4 showing clustered bar chart showing prevalence of risk factors among ACS patients. Hypertension and smoking were most frequent, followed by diabetes and dyslipidemia.

3.5 Comparison of ACS vs Non-ACS Patients

Compared with non-ACS chest pain patients, those with ACS were older (mean 57.3 vs. 53.1 years), more likely to be male, and had a higher prevalence of hypertension, diabetes, and smoking.

Table 5. *Comparison between ACS and Non-ACS patients*

Variable	ACS (n=82)	Non-ACS (n=118)	p-value*
Mean Age (years)	57.3 ± 11.2	53.1 ± 13.1	<0.05
Male gender (%)	68.3%	58.5%	NS
Hypertension (%)	56%	34%	<0.01
Diabetes (%)	38%	21%	<0.01
Smoking (%)	44%	28%	<0.05

**Chi-square test applied; NS = not significant.*

Table-5 showing grouped bar chart comparing risk factor distribution in ACS vs Non-ACS patients, showing higher prevalence of hypertension, diabetes, and smoking among ACS patients.

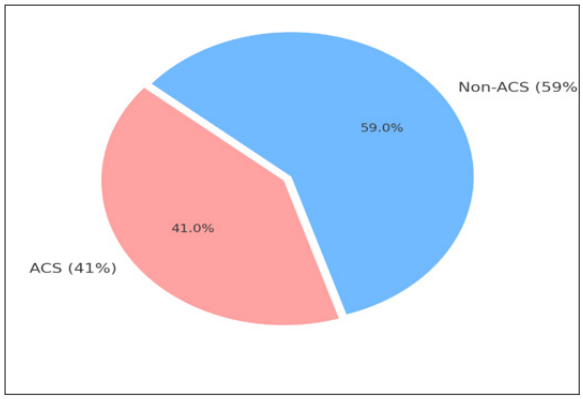

Figure 1. *Prevalence of acute coronary syndrome (ACS) versus non-ACS causes among 200 patients*

Pie chart showing the prevalence of acute coronary syndrome (ACS) versus non-ACS causes among 200 patients presenting with chest pain. Out of the total, 82 patients (41%) were diagnosed with ACS, while 118 patients (59%) had non-cardiac causes.

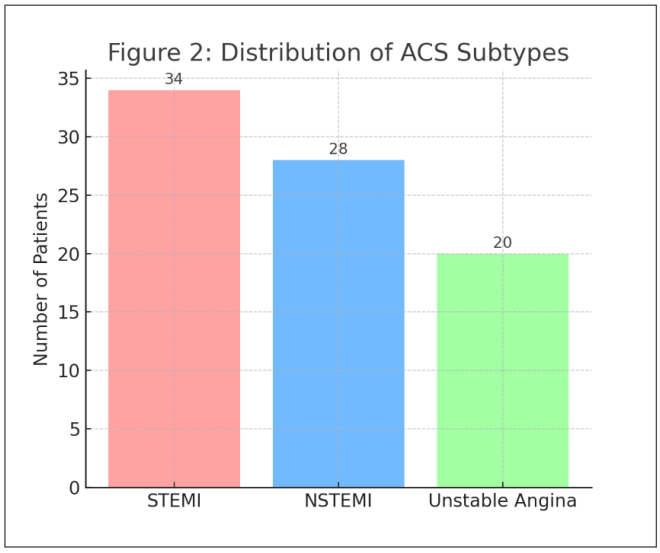

Figure 2. *distribution of ACS subtypes*

Bar chart showing the distribution of ACS subtypes among 82 patients. STEMI was the most frequent presentation (34 cases, 41.5%), followed by NSTEMI (28 cases, 34.1%), and unstable angina (20 cases, 24.4%).

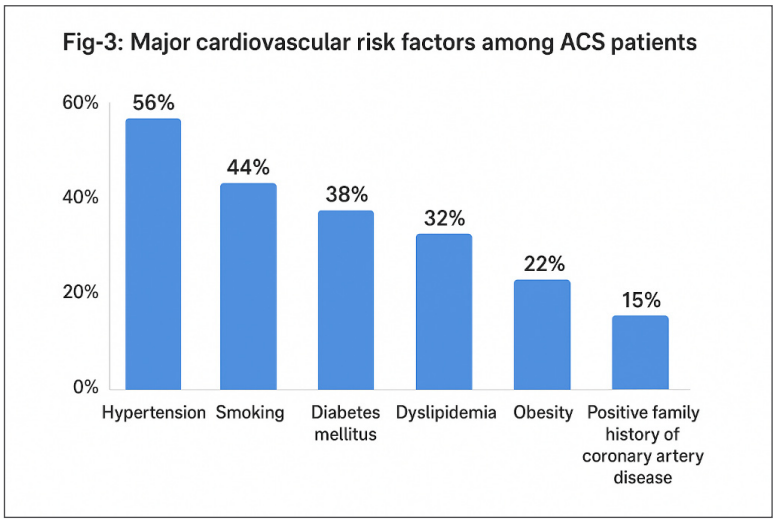

Figure 3. *Major cardiovascular risk factors among ACS patients*

Bar chart depicting the prevalence of major cardiovascular risk factors among ACS patients. Hypertension (56%) was the most common, followed by smoking (44%), diabetes mellitus (38%), dyslipidemia (32%), obesity (22%), and positive family history of coronary artery disease (15%).

4. Discussion

The present study was conducted to evaluate the prevalence of acute coronary syndrome (ACS) among patients presenting with chest pain in the emergency department of a tertiary care hospital. Out of 200 patients, 82 (41%) were diagnosed with ACS. Among these, 41.5% were STEMI, 34.1% NSTEMI, and 24.4% unstable angina. The mean age of ACS patients was 57.3 years, and nearly two-thirds were male. Hypertension, smoking, and diabetes mellitus were the most common risk factors. These findings highlight several important clinical and epidemiological aspects of ACS presentation in South Asia, particularly in countries such as Bangladesh, where the burden of cardiovascular disease is rapidly increasing.

4.1 Prevalence of ACS among Chest Pain Patients

Our study found an ACS prevalence of 41% among patients with chest pain, which falls at the higher end of the spectrum compared to global literature. In Western populations, the reported prevalence of ACS in chest pain cohorts ranges between 25% and 35% [1,2]. For instance, Goodacre et al. in the UK found ACS prevalence to be 29% among 8,000 chest pain patients [3]. In contrast, studies from South Asia tend to show higher rates: Gupta et al. reported 39% in the Indian CREATE registry [4], while Jafar et al. reported 42% in Pakistan [5]. The higher prevalence in South Asia may be attributed to multiple factors including earlier onset of coronary artery disease, higher burden of uncontrolled risk factors, and delayed hospital presentation due to lack of awareness and limited access to emergency care. Moreover, a significant proportion of chest pain in high-income countries is non-cardiac in origin (musculoskeletal, gastrointestinal, psychiatric), whereas in low- and middle-income countries cardiovascular causes are relatively more common [6].

4.2 Distribution of ACS Subtypes

Among the ACS cases in our study, STEMI was the most frequent subtype (41.5%), followed by NSTEMI (34.1%) and unstable angina (24.4%). This pattern is consistent with findings from the Global Registry of Acute Coronary Events (GRACE) and other registries, which also report STEMI as the predominant form of ACS in developing countries [7,8]. However, studies from high-income nations such as the United States and Europe increasingly report NSTEMI as the dominant subtype [9]. This epidemiological shift is thought to be due to better risk factor control, widespread use of preventive medications (statins, antiplatelets), and improved primary prevention strategies that have reduced the incidence of STEMI [10]. In contrast, in South Asia, delayed presentation, lack of widespread use of preventive therapies, and poor control of hypertension and diabetes contribute to higher rates of STEMI [11]. Furthermore, limited availability of primary percutaneous coronary intervention (PCI) in rural and semi-urban areas exacerbates STEMI-related morbidity and mortality [12].

4.3 Demographic Profile

The mean age of ACS patients in this study was 57.3 years, with a male predominance (68.3%). This is consistent with other South Asian studies, which have consistently demonstrated earlier onset of ACS compared to Western countries [13]. For example, the INTERHEART study found that first myocardial infarction in South Asians occurred almost a decade earlier than in Europeans [14]. Male predominance in ACS has been reported globally. However, the increasing burden of ACS in women is also noteworthy. Although women in our study accounted for only 31.7% of ACS cases, they often present with atypical symptoms, leading to delayed diagnosis and worse outcomes [15]. Prior studies have highlighted gender disparities in ACS recognition and management, with women less likely to receive reperfusion therapy or evidence-based medications [16].

4.4 Risk Factors for ACS

The most common risk factors in our study were hypertension (56%), smoking (44%), diabetes mellitus (38%), and dyslipidemia (32%). These findings align with previous South Asian studies that have documented the clustering of cardiovascular risk factors at relatively younger ages [17,18]. Hypertension was the leading risk factor, consistent with its role as a major contributor to endothelial dysfunction, atherosclerosis, and plaque rupture [19]. Smoking was present in nearly half of ACS patients, reflecting the high prevalence of tobacco use in South Asia, particularly among men. Smoking has been shown to double the risk of myocardial infarction and is strongly associated with STEMI presentations [20]. Diabetes mellitus was found in 38% of ACS cases in our cohort. The South Asian population is known for higher rates of insulin resistance and metabolic syndrome, leading to earlier onset and more severe atherosclerosis [21]. Diabetic patients often have multivessel disease and worse outcomes after ACS [22]. Dyslipidemia, though less prevalent than hypertension or diabetes, was present in one-third of ACS patients. Interestingly, studies show

that South Asians have a higher prevalence of low HDL cholesterol and elevated triglycerides, a pattern associated with increased risk of premature coronary disease [23]. Obesity (22%) and family history (15%) were less common but still relevant. The INTERHEART study showed that nine modifiable risk factors, including the ones found in our study, accounted for over 90% of myocardial infarction risk worldwide [14].

4.5 Comparison with Global Studies

Our results are in agreement with regional and global findings but highlight specific South Asian trends. While ACS prevalence in Western chest pain cohorts is lower, South Asia faces an epidemic of premature CAD [24]. Moreover, the risk factor profile in South Asia is distinct: higher prevalence of diabetes, central obesity, and dyslipidemia with lower BMI thresholds [25]. For example, a study in the United States reported mean ACS onset age of 65–67 years [26], compared to 57 years in our cohort and similar regional studies [27]. This suggests a need for earlier screening and prevention programs in South Asia.

4.6 Clinical Implications

The high prevalence of ACS in chest pain patients underscores the importance of rapid triage and evidence-based management in emergency departments. Implementation of chest pain protocols, including immediate ECG, cardiac biomarkers, and risk stratification scores (TIMI, GRACE), can significantly improve outcomes [28]. Given the predominance of modifiable risk factors, preventive strategies targeting hypertension, smoking cessation, diabetes control, and dyslipidemia management are essential. Public health campaigns should focus on lifestyle modification and awareness of early ACS symptoms.

Limitations

The study has some limitations. First, it was conducted in a single tertiary care hospital, which may limit generalizability. Second, the sample size was modest (200 patients), and larger multicenter studies would provide more robust prevalence estimates. Third, the cross-sectional design precludes assessment of long-term outcomes. Despite these limitations, the study provides valuable insights into the burden of ACS in chest pain patients in our setting.

4.7 Future Directions

Future research should focus on multicenter, prospective studies with larger populations to confirm these findings. Additionally, exploring barriers to early presentation and treatment in South Asia is critical. Strategies to improve access to reperfusion therapy, particularly primary PCI, and adherence to guideline-directed therapy should be prioritized.

5. Conclusion

In summary, this study demonstrates that ACS is highly prevalent among chest pain patients in South Asia, with STEMI being the most common presentation. The burden of hypertension, smoking, and diabetes highlights the urgent need for preventive strategies. Comparisons with global data suggest that South Asians experience ACS at younger ages, with more severe risk factor clustering. Strengthening emergency care pathways and addressing modifiable risk factors could significantly reduce the morbidity and mortality associated with ACS.

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