

## PROFILE OF ACUTE MYOCARDIAL INFARCTION (AMI) IN PAKISTAN

Maqbool H. Jafary<sup>1</sup>, Abdus Samad<sup>2</sup>, Mohammad Ishaq<sup>3</sup>,  
Shaukat Ali Jawaid<sup>4</sup>, Mansoor Ahmad<sup>5</sup>, Ejaz Ahmad Vohra<sup>6</sup>

On behalf of AAUS\*\* Study Group of Pakistan Aspirin Foundation, Karachi, Pakistan

### ABSTRACT

**Objective:** While doing the study on Aspirin Awareness and Usage (AAUS) in cases of Acute Coronary Syndrome (ACS), AAUS study Group designed the protocol to include the profile of patients presenting with symptoms of ACS and in the light of that also reviewed the available data in South Asian population.

**Methodology:** A prospective study was carried out in 17 coronary care units (CCUs) in all 4 provinces of Pakistan. Patients included were males and females of all age groups presenting with chest pain, diagnosed to have Coronary Artery Disease (CAD) and categorized into Unstable Angina (USA), STEMI or NSTEMI, based on clinical, ECG and enzymatic criteria. The risk factors, family history, dietary history, time to reach ER after the onset of symptoms, management of ACS in CCU and outcome of treatment were recorded.

**Results:** A total of 1,527 patients presented to the Emergency Room (ER) with chest pain but around 1400 patients were evaluable. The majority (68%) were males. The mean age of all patients was 52.2±10.7 years. 28.3% patients were <45 years. Average time to presentation at ER was 13.2±6.2 hours. 92.7% patients presented with chest pain. More than half the patients had hypertension (55.2%) and or smoking (52%) as the risk factors while 37.2 % had diabetes and 18.2% had hyperlipidemia. Hypertension (52.7%), IHD (44%) and Diabetes (36.2%) figured prominently in the family history. USA and STEMI were the major types of ACS (43.0% and 40.5% respectively). At discharge 67.8% of patients were stable without symptoms, 13.3% were stable but with symptoms, 16.4% were referred for further investigations and 2.5% had died.

**Conclusions:** The review of the available data in Pakistan, supported by the present study in a cohort of 1400 patients from 17 CCUs in the country, the emerging profile of patients with AMI is that the majority are male, relatively younger as compared to Western population, have smoking and hypertension followed by diabetes as the major risk factors. USA and STEMI are the dominant types of ACS and the majority of patients are likely to have hypertension, IHD and diabetes in their families. Better control of risk factors and the awareness of preventive strategies are needed.

**KEY WORDS:** Acute Coronary Syndrome (ACS), Acute Myocardial Infarction (AMI), Risk factors, Ischaemic Heart Disease, Profile.

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### Correspondence:

1. Dr. Maqbool H. Jafary, FRCP  
Consultant Cardiologist,  
KIHD and Midciti Hospital,  
Karachi - Pakistan.  
E mail: drjafary@gmail.com

2-6: Affiliation of authors see page 489

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\*\* Aspirin Awareness & Usage Study (AAUS)

### INTRODUCTION

Cardiovascular risk factors for ischemic heart disease and AMI are on the rise in Pakistan. 18% of adult population suffers from hypertension, smoking and tobacco use has increased and obesity is increasing.<sup>1</sup> 16.2% men and 11.7% women have diabetes mellitus while another 8.2% men and 11.7% women have impaired glucose tolerance.<sup>2</sup> With increasing affluence

and facilities of life, there is a definite change in life style and there is more and more tendency for sedentary habits. Exercise and outdoor activities seem to have decreased. As a consequence, cardiovascular diseases like myocardial infarction and stroke have become the leading causes of morbidity and mortality in Pakistan.

While studying the pattern of Aspirin use in patients with ACS in Pakistan, an additional objective was to study the demographics, presentation, risk factors, management and outcome of patients presenting with ACS. This was a cross country study, involving 17 Coronary Care Units (CCUs) throughout the country. These units are located in major cities as well as provincial headquarter towns in the country.

## PATIENTS AND METHODS

This was a prospective study conducted in acute Coronary Care Units (CCUs) of 17 major hospitals in Pakistan, spread across all four provinces of the country and manned by trained physicians. The study population included all male and female patients consecutively presenting to the Emergency Room with cardiac chest pain, shortness of breath or syncope. These patients were diagnosed to have Coronary Artery Disease (CAD) based on clinical, electrocardiographic and enzymatic criteria of ACS. They were further categorized into Unstable Angina (USA), STEMI and NSTEMI. A comprehensive questionnaire, validated by a pilot study, was used. It had questions related to coronary artery disease risk factors, comprehensive dietary history, family history, time to reach ER after the onset of chest pain, management of ACS in CCU and the outcome of treatment. The questions were administered by trained physicians. A formal written informed consent of the patients was obtained for participation in the study. The sampling method was one of convenience sampling with all patients presenting with cardiac chest pain for ACS for enrollment in the study.

Any patient falling short of the inclusion criteria, those who refused enrollment and

those with contraindications to the use of aspirin were excluded from the study. The patients were followed during the hospital stay till their discharge.

*Statistical Analysis:* Data are expressed as Median (range) or Mean ( $\pm$  Standard deviation) for continuous variables or as rates (percentage) for categorical variables. The data was entered and analyzed using the SPSS software.

## RESULTS

One thousand five hundred twenty seven consecutive patients presented at the ER of the hospitals of which around 1400 patients were evaluable. Non-evaluable patients were those who did not meet the inclusion criteria, refused to be part of the study or had their case report forms grossly inadequate. Patient demographics of 1400 eligible patients are given in Table-I. Majority (68%) were males. Patients' mean age at presentation was  $52.2 \pm 10.7$  years. The mean age of STEMI and NSTEMI patients was  $51 \pm 9.9$  and  $53.11$  respectively,  $p = 0.034$ .

Relatively younger patients (<45 years) represented 28.3% of all patients while 22.5% represented patients > 60 years of age. The average time duration between the onset of symptoms and presentation at the hospital was  $13.2 \pm 6.2$  hours. Mean BMI was  $26.5 \pm 5$ . The presenting symptoms included Unstable angina in 547(39%), chest pain in 1299(92.7%), shortness of breath in 602(43%) and syncope in 87(6.2%).

Table-I: Patient Demographics (n=1400)

Males	953 (68.1%)	
Females	447 (31.9%)	
Age (years)		
	Mean	$52.5 \pm 10.8$
	< 45	28.3%
	> 45	71.7%
	< 60	77.5%
	> 60	22.5%
BMI	Mean	$26.5 \pm 5.5$
Time to admission after onset of symptoms (Mean)	$13.2 \pm 6.2$ hours	

Table-II shows the co-morbid conditions and the family history. More than half the patients had hypertension (55.2%) and or smoking (52.0%). Their family history revealed that a significant number (52.7%) had hypertension, 44% had ischemic heart disease and 36.2% had diabetes in their families.

Table-III shows the types of ACS and the final outcome at the time of discharge from hospital. Unstable Angina and STEMI were almost equal in presentation [43% and 40.5% respectively] while 16.5% had NSTEMI. At discharge the majority of patients (67.8%) were stable and had no symptoms, 13.3% were stable but with symptoms, 16.4% were referred for further investigations and 2.5% died.

## DISCUSSION

Even though AAUS study was directed towards Aspirin awareness and use in the patients presenting with ACS, the assessment of AMI profile was built into the protocol. This study has involved, so far, the largest number of patients (1400) in Pakistan for assessment of aspirin awareness and profile of AMI.

Based on this study the typical profile of patients would be that the majority are males, with a mean age of around 52 years, bordering on being obese, presenting with chest pain and having smoking, hypertension followed by diabetes as the major risk factors. They are also likely to have family history of hypertension, IHD and diabetes. In addition 28.3% of our patients were below 45 years of age. Majority of the patients had Unstable Angina and STEMI in equal proportion as the types of ACS.

Comprehensive data of the characteristics and profile of AMI patients in the Pakistani subjects is inadequate and no major surveys have been published. However, some data is available. Samad Z et al<sup>3</sup> reported AMI patient profile hospitalized in a tertiary care hospital. Their findings, which match our study, for male preponderance. However, their patients with chest pain presented to hospital much earlier (within 2 hours of symptoms onset) and those without chest pain but dyspnoea presented after 12 hours of onset of symptoms as

Table-II: Co-morbid Conditions & Family History (n= 1400)

<i>Co-morbid</i>	
Hypertension	55.2%
Smoking	52.0%
Diabetes mellitus	37.8%
Existing IHD	38.7%
Hyperlipidemia	18.2%
<i>Family History</i>	
Hypertension	52.7%
Diabetes mellitus	36.2%
IHD	44.6%
Hyperlipidemia	7.0%

compared to our study (13.2+ 6.2 hours). Even then the mortality rate in our study was lower at 2.5% vs.10.8% possibly because more of their patients presented with shock.

Saleheen and Frossard<sup>4</sup> reported that relatively younger patients (< 45 years) represented 16.1% of total patients. These patients were more likely to be smokers and had high lipid levels. In our study almost one third patients (28.3%) belong to the relatively younger age group of <45 years.

Ahmad and Shafique<sup>5</sup> looked at the risk factors for AMI of younger age group. 19% of their patients were under 40 years of age. Majority (87%) were males. They had the risk factors of smoking in 79%, hypertension in 35%, diabetes in 31% and hyperlipidemia in 19%.

Ishaq M et al<sup>6</sup> also reported that coronary artery disease is more prevalent in males. They found that smoking was the commonest risk factor amongst males while majority of females were obese, hypertensive and had abnormal lipid levels. These risk factors are almost similar to our study. In another study by Abbas

Table-III: Types of ACS and Outcome (n=1400)

<i>Types of ACS</i>	
Unstable angina	43%
STEMI	40.5%
NSTEMI	16.5%
<i>Outcome</i>	
Stable without symptoms	67.8%
Stable with symptoms	13.3%
Referred for investigations	16.4%
Died	2.5%

S et al<sup>7</sup> the pattern of risk factors is almost similar to the preceding studies in terms of male preponderance (73.8%), smoking (57.8%), hypertension and significantly higher prevalence of diabetes in women than men in all age groups and increasing with increasing age (5.0% to 16.9% vs. 3.1% to 10.1%). In contrast to these studies, Jafar et al.,<sup>8</sup> in their population-based cross sectional survey, found the prevalence of IHD to be equally prevalent in men and women [26.9% in men and 30% in women ( $p=0.12$ )]. However, the major risk factors like smoking and hypertension were similar to other observations. These risks were equally high in young patients and women. A case-control study<sup>9</sup> from India showed a similar risk factor profile of high level of smoking, hypertension and diabetes. Lipid profile did not figure prominently in this study.

Mean age of the patients in our study was  $52.5 \pm 10.8$  years while only 22.5% were over 60 years of age. This highlights the fact that Pakistani patients are at least 10 years younger to what is seen in West. The recent COURAGE trial<sup>10</sup> in USA shows the mean age as  $62 \pm 5$  years but with male preponderance (85%). In contrast to our study the risk factors like smoking is much less in this study (29% vs. 52%). However, hypertension (68%) and diabetes (34%) figure prominently as risk factors similar to South Asian studies. Another recent study<sup>11</sup> compared the ACS in South Asians and Caucasians. It showed that Asians were at least 10 years younger to the Caucasians at the time of presentation of ACS.

An important observation is that up to 28% of the patients belong to the relatively younger age group of 40-45 years. In a study by Siwach SB et al<sup>12</sup> in India, 19.2% of the patients were 40 years or below in age. Even though their patients were lean and involved in heavy physical work, smoking was the most common risk factor. This lends to the general belief that not only the mean age of patients with AMI is lower by at least a decade but also it is affecting more and more younger population in South Asia. In our study, the time between the onset of symptoms and arrival at the emergency room

of the hospital was disturbingly long at an average of  $13.2 \pm 6.2$  hours. Most of the studies reviewed do not mention this factor in their data. It is an important element to record and educate the patients accordingly that the delay should be minimized to reduce morbidity and mortality in AMI.

It seems that the risk factors like smoking, hypertension and diabetes are responsible for a major disease burden for AMI and CAD which contribute to morbidity and mortality. These require a better control. The awareness of risk factors amongst the general public is low.<sup>13</sup> Thus there is an urgent need to create more and more awareness about the preventive aspects and healthier life style behavior in the community.

There are several limitations of the study. It was not a standalone study exclusively meant for profiling of the patients for AMI but rather a part of aspirin awareness and usage study. The immediate outcome of the patients may have become biased due to focus on aspirin use. Medium and longer term outcome of these patients is not available. Also not available are the details of angiographic studies which were done subsequently in some patients as a part of investigations. As the study was not mandated to look at the mortality after AMI, the number of in-hospital deaths reported is low and could well be inaccurate.

In spite of the limitations highlighted above, it seems still reasonable to draw some conclusions about the emerging profile of AMI in the patients in Pakistan. Majority (two third) of the patients are likely to be males, bordering on being obese, with predominant risk factors of smoking, hypertension and diabetes. They are more likely to have hypertension, IHD and diabetes in their families. USA and STEMI are equally common presentations. Almost similar profile has been shown in the other studies reviewed from Pakistan and South Asia. Preventive strategies and accelerated efforts to create awareness are needed.

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**Participating Centers:**

1. Fatima Jinnah Medical College, Lahore (Prof. Akbar Chaudry)
2. Ayub Medical College, Abbott Abad (Dr. Waqar Mufti)
3. District Headquarter Hospital, Sialkot (Dr. Sohail Tufail).
4. Red Crescent Hospital, Hyderabad (Dr. Fazalur Rehman).
5. Liaquat University of Medical Sciences, Hyderabad (Prof. Nazeer Memon).
6. Civil Hospital, Mirpurkhas (Dr. Akram Sultan).
7. Doctors Hospital, Lahore (Prof. M. Sarwar).
8. NICVD, Karachi (Prof. M. Ishaq).
9. Civil Hospital, Larkana (Dr. Saeed Sangi).
10. Mayo Hospital, Lahore (Prof. Javed Akram).
11. BV Hospital, Bahawalpur (Dr. Shafique Ahmad).
12. Ziauddin Hospital, Karachi (Prof. Ejaz Ahmed Vohra).
13. PIMS, Islamabad (Prof. Afzal Mattu).
14. AFIC, Rawalpindi (Maj. Gen. M.H. Nuri).
15. Liaquat National Hospital, Karachi (Prof. Mansoor Ahmad).
16. DHQ Hospital Faisalabad (Dr. Javaid Iqbal)
17. Hearts International Hospital, Rawalpindi (Maj. Gen. Ashur Khan)

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**Authors:**

1. Dr. Maqbool H Jafary FRCP  
Consultant Cardiologist  
Karachi Institute of Heart Diseases  
and Midcity Hospital,  
Karachi - Pakistan.
2. Prof. Abdus Samad MD  
Karachi Institute of Heart Diseases,  
Karachi - Pakistan.
3. Prof. Mohammad Ishaq FRCP  
National Institute of Cardiovascular Diseases,  
Karachi - Pakistan.
4. Mr. Shaikat Ali Jawaid  
Chief Editor,  
Pulse International,  
Karachi - Pakistan.
5. Prof. Mansoor Ahmad FRCP  
Liaquat National Hospital,  
Karachi - Pakistan.
6. Prof. Ejaz Ahmad Vohra FRCP,  
Ziauddin Medical University  
Karachi. Pakistan.