

**ORIGINAL RESEARCH****Unveiling the Precursors: A Comprehensive Assessment of Risk Factors for Premature Acute Myocardial Infarction**

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**ABSTRACT:**

**Background:** Myocardial infarction (MI), colloquially known as "heart attack," is caused by decreased or complete cessation of blood flow to a portion of the myocardium. Myocardial infarction may be "silent," and go undetected, or it could be a catastrophic event leading to hemodynamic deterioration and sudden death.

**Aims and objectives:** This study was conducted to evaluate the risk factors of premature acute myocardial infarction.

**Material and methods:** For this investigation, a total of 100 individuals with acute myocardial infarction as the primary diagnosis were chosen. These participants were split into two groups of 50 each. 50 participants from the first group had premature AMI, while 50 participants from the second group did not. The study excluded participants under the age of 18 and those who experienced myocardial injury as a result of aetiologies such as interventional procedures, cardiac and non-cardiac surgery, heart failure, trauma, or viral shock. Age at the time of the AMI, gender, height, weight, smoking history, family history of CHD, diabetes, dyslipidemia, chronic kidney disease (CKD), peripheral arterial disease (PAD), and stroke were among the variables taken from the patients' medical records at the time of hospitalisation.

**Results:** The study population consisted of 100 AMI patients. AMI was evident in 76 males and 24 females. The premature AMI group consisted of 47 males and 3 females while there were 29 males as well as 21 females in the non-premature AMI group. The most common risk factors in the general population were dyslipidemia (63%), hypertension (71%), smoking (69%), obesity (87%) and diabetes mellitus (84%). Risk factors include obesity and a family history of CHD were more common in the preterm AMI group than in the non-premature AMI group. The non-premature AMI group had higher rates of hypertension, diabetes, CKD, smoking, dyslipidemia, and stroke.

**Conclusion:** AMI in young patients is associated with unhealthy lifestyles such as smoking, dyslipidemia, and obesity. Low LVEF, elevated NT-proBNP peak level, and the occurrence of in-hospital MACCEs were predictors of poor prognosis in premature AMI patients.

**Keywords:** acute myocardial infarction, risk factors, prognosis, premature

**Introduction**

AMI, usually referred to in lay terms as a heart attack, is most often caused by a decrease or stoppage of blood flow to a portion of the heart, leading to necrosis of heart muscle. This is generally the result of a blood clot in the epicardial artery that supplies that territory of heart muscle. It is now recognized that, based on how AMI is defined, not all cases necessarily require a blood clot etiologically. In all living tissue such as heart muscle, the blood supply must equal the oxygen demands of the muscle.

This is termed the supply–demand ratio. It is now appreciated that an imbalance in this ratio (too little supply or too much demand) as might occur with a very rapid heart rate (too much demand) or a drop in blood pressure (too little supply) may lead to myocardial damage without the presence of a blood clot per se. Over the last 10 years, a universal definition of AMI has been available to help the clinician with its diagnosis.<sup>1,2</sup>

Myocardial infarction mostly presents with atypical signs and symptoms and has different risk factors in young individuals compared to older individuals. These risk factors are often preventable, therefore recognizing them and taking precautions can save these patients from suffering myocardial infarction. Scarcity of studies and lack of guidelines for assessment and management of young MI patients, make it more challenging for these individuals to get accurate medical care, even though MI in this age group is on the rise. Traditional risk factors, such as smoking, hyperlipidemia, hypertension, male sex, obesity, and family history of premature cardiovascular disease, contribute to the risk of myocardial infarction at a young age, but additional non-traditional risk factors, such as substance abuse, thrombophilia, coronary anomalies, immune disease, allergic reactions, and psychological stressors, uniquely contribute to the risk profile of young individuals.<sup>3</sup>

### Aims and objectives

This study was conducted to evaluate the risk factors of premature acute myocardial infarction.

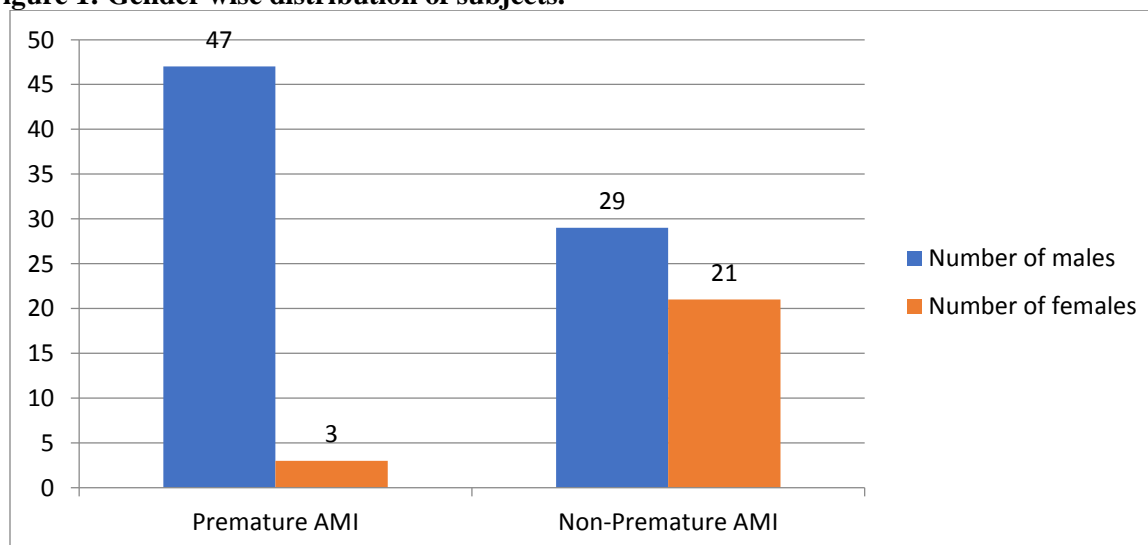
### Material and methods

For this investigation, a total of 100 individuals with acute myocardial infarction as the primary diagnosis were chosen. These participants were split into two groups of 50 each. 50 participants from the first group had premature AMI, while 50 participants from the second group did not. The study excluded participants under the age of 18 and those who experienced myocardial injury as a result of aetiologies such as interventional procedures, cardiac and non-cardiac surgery, heart failure, trauma, or viral shock. Age at the time of the AMI, gender, height, weight, smoking history, family history of CHD, diabetes, dyslipidemia, chronic kidney disease (CKD), peripheral arterial disease (PAD), and stroke were among the variables taken from the patients' medical records at the time of hospitalisation. Data obtained during hospitalisation included: haemoglobin, leukocyte count, platelet count, N-terminal pro-B-type natriuretic peptide (NT-proBNP) peak, cardiac troponin T (cTnT) peak, blood glucose level, lipid levels [cholesterol, triglycerides, high-density lipoprotein cholesterol (HDL-C), low-density lipoprotein cholesterol (LDL-C)], serum potassium level, electrocardiogram results and echocardiography results. In order to analyse the data, IBM SPSS statistics 26.0 was used.

### Results

The study population consisted of 100 AMI patients. AMI was evident in 76 males and 24 females. The premature AMI group consisted of 47 males and 3 females while there were 29 males as well as 21 females in the non-premature AMI group.

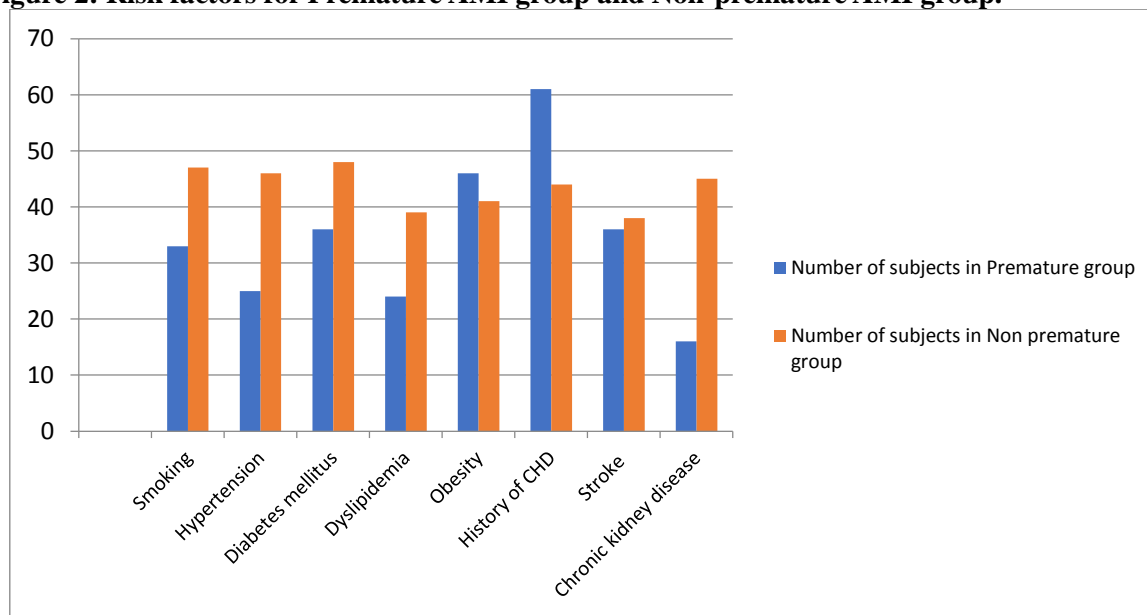
**Figure 1: Gender wise distribution of subjects.**



**Table 1: Gender wise distribution of subjects.**

Groups	Number of males	Number of females	Total
Premature AMI	47(94%)	03(06%)	50(100%)
Non-Premature AMI	29(58%)	21(42%)	50(100%)

The most common risk factors in the general population were dyslipidemia (63%), hypertension (71%), smoking (69%), obesity (87%) and diabetes mellitus (84%). Risk factors include obesity and a family history of CHD were more common in the preterm AMI group than in the non-premature AMI group. The non-premature AMI group had higher rates of hypertension, diabetes, CKD, smoking, dyslipidemia, and stroke.

**Figure 2: Risk factors for Premature AMI group and Non-premature AMI group.****Table 2: Risk factors for Premature AMI group and Non-premature AMI group.**

Risk factors	Number of subjects in Premature group (n=50)	Number of subjects in Non premature group (n=50)
Smoking	33	47
Hypertension	25	46
Diabetes mellitus	36	48
Dyslipidemia	24	39
Obesity	46	41
History of CHD	61	44
Stroke	36	38
Chronic kidney disease	16	45

## Discussion

Most myocardial infarctions are due to underlying coronary artery disease, the leading cause of death in the United States. With coronary artery occlusion, the myocardium is deprived of oxygen. Prolonged deprivation of oxygen supply to the myocardium can lead to myocardial cell death and necrosis.<sup>4</sup> Patients can present with chest discomfort or pressure that can radiate to the neck, jaw, shoulder, or arm. In addition to the history and physical exam, myocardial ischemia may be associated with ECG changes and elevated biochemical markers such as cardiac troponins.<sup>5,6</sup>

The prevalence of the disease approaches three million people worldwide, with more than one million deaths in the United States annually. Acute myocardial infarction can be divided into two categories,

non-ST-segment elevation MI (NSTEMI) and ST-segment elevation MI (STEMI). Unstable angina is similar to NSTEMI. However, cardiac markers are not elevated. An MI results in irreversible damage to the heart muscle due to a lack of oxygen. An MI may lead to impairment in diastolic and systolic function and make the patient prone to arrhythmias. In addition, an MI can lead to a number of serious complications. The key is to reperfuse the heart and restore blood flow.<sup>7</sup>

In this study, out of 100 patients, AMI was evident in 76 males and 24 females. The premature AMI group consisted of 47 males and 3 females while there were 29 males as well as 21 females in the non-premature AMI group. In the overall population, dyslipidemia (63%), hypertension (71%), smoking (69%), obesity 87(%), and diabetes mellitus (84%) were the most prevalent risk factors. Compared to the non-premature AMI group, risk factors such as obesity and a family history of CHD (coronary heart disease) were more prevalent in the premature AMI group. Meanwhile, hypertension, diabetes, CKD, smoking, dyslipidemia and stroke were more common in the non-premature AMI group.

The MI incidence for a 10-year follow-up was 12.9, 38.2, and 71.2 per 1000 in males and 2.2, 5.2, and 13.0 per 1000 in females in the age groups of 30–34, 35–44, and 45–54 years, respectively, in the Framingham Heart Study.<sup>8</sup>

The clinical course, risk factors, and coronary anatomy of MIs that develop at a young age differ from those at older ages.<sup>9</sup> Young patients with MI usually have a better short-term prognosis than middle-aged and elderly patients.<sup>10,11</sup> In the TUMAR study in the early 2000s, in-hospital mortality of acute MI was significantly lower in patients aged <50 years than in other age groups.<sup>12,13</sup> Long-term survival is also considered better in younger patients compared to older patients presenting with MI. However, the 10-year survival of a person with MI at the age of 40 will be considerably shorter than that of those aged 60 years.

### Conclusion

In this study, the risk factors for premature acute myocardial infarction (AMI) were evaluated in a cohort of 100 patients. The most common risk factors in the overall population were dyslipidemia, hypertension, smoking, obesity, and diabetes mellitus. When comparing the premature AMI group to the non-premature AMI group, obesity and a family history of coronary heart disease (CHD) were more prevalent in the premature AMI group. Conversely, the non-premature AMI group had higher rates of hypertension, diabetes, chronic kidney disease (CKD), smoking, dyslipidemia, and stroke.

These findings emphasize the importance of identifying and managing risk factors for AMI, especially in young individuals who may have distinct risk profiles compared to older individuals. Preventive strategies targeting modifiable risk factors such as obesity, smoking cessation, and management of hypertension, diabetes, and dyslipidemia should be implemented to reduce the burden of premature AMI.

Further research and guidelines are warranted to improve the assessment and management of young patients with AMI, considering the rising incidence of myocardial infarction in this age group. By recognizing and addressing the unique risk factors associated with premature AMI, healthcare professionals can enhance early detection, risk stratification, and tailored interventions to improve outcomes and long-term survival in these individuals.

**Conflict of Interest:** - None declared

**Source of support:** - Nil

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