

A Retrospective Research Assessing the Rising Risk Factors of Acute Myocardial Infarction

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Aim: A study focusing emerging risk factors in patients of acute myocardial infarction in Bihar region. **Methods:** A retrospective study was conducted in the Department of Cardiology, Patna Medical College and Hospital, Patna, Bihar, India for 1 year. Patients with acute ST elevation Myocardial Infarction (STEMI) and typical rise of cardiac biomarkers either in the form of Creatine Kinase-MB (CKMB) or Troponin were included in this study. Baseline characteristics like age, sex, clinical history, conventional risk factors, duration of symptoms, type of thrombolytic agent used, and coronary angiogram results were analyzed in detail. **Results:** In this study, 70% patients were males, and 30% patients were females indicating high prevalence of Acute Coronary Syndrome in men. 60 (%) patients had AAMI indicating high prevalence of AAMI in STEMI. 37% patients had inferior wall MI. In our study 35% patients had diabetes indicating Diabetes is one of the most common risk factors. The prevalence of diabetes in our study was 35%. Diabetes is one of the common risk factors still need to be controlled in India. In our study patients 45% had hypertension indicating it's the one of the common causes for acute coronary syndrome. In our study 55% of the patients were smokers most (90%) of them were men indicating high prevalence of ACS in smokers. Smoking accelerates the atherosclerotic process and provoke myocardial infarction in young patients. In this study, patients had BMI 5% patients had BMI <25 kg/m², 65% patients had BMI between 25-30 kg/m², 30% of the patients had BMI between 30-40 kg/m² indicating CAD is more common in overweight patients than obese patients. In this study, 10 patients had depression even though it's not a significant factor treating depression lowers the ACS risk. **Conclusion:** The modifying risk factors such as smoking, increased levels of body fat, consuming too much fat and salt, and a sedentary lifestyle together with the use of accessible and affordable preventive medicines, can lower the risk of CAD.

Keywords: CAD, MI, BMI, lifestyle

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Introduction

Non-communicable diseases (NCDs), which generally include cardiovascular disease (CVD), diabetes, respiratory disease and cancer, are a major driver of global mortality.[1] The WHO estimated that NCDs annually claim approximately 15 million lives within the age group of 30–70 years (termed ‘premature mortality’), with the major burden concentrated in low-income and middle-income countries.[2] CVD is the major contributor to NCD-related morbidity and mortality, and in 2016, it claimed 17.6 million lives globally.[3] The majority of CVD-related deaths comes from ischaemic heart disease, which is composed of acute myocardial infarction (MI) and ischaemic heart failure.[4] In 2016, ischaemic heart disease (IHD) claimed 9.5 million lives, a 19% increase over the prior decade, attributed to ageing and a growing population.[3] The high burden of IHD, particularly among young adults, adversely affects personal and economic productivity, health of caregivers and increases healthcare costs.[5,6] Reducing the burden of IHD is a key priority for all countries.

Although premature mortality refers to mortality in the age group of 30–70 years, premature MI generally refers to MI in men \leq 55 years or women \leq 65 years.[7-9] Although diagnosis, management and treatment of MI have improved, results on IHD mortality in young adults have been mixed. A US study showed that IHD mortality in young women (<55 years) has remained unchanged over a 20-year period from 1990 to 2011.[10] Similarly, in countries including Australia, Canada and Scotland, young adults have shown minimal to no improvement, higher IHD mortality, or different IHD mortality for men versus women.[11] The reasons for

suboptimal IHD mortality in young adults are incompletely understood and require further characterization.

Materials and Methods

A retrospective study was conducted in the Department of cardiology, Patna Medical College and Hospital, Patna, Bihar, India for 1 year. After taking the approval of the protocol review committee and institutional ethics committee.

Patients with acute ST elevation Myocardial Infarction (STEMI) and Typical rise of cardiac biomarkers either in the form of Creatine Kinase-MB (CKMB) or Troponin were included in this study. Patients with Non STemi, History of previous revascularization and Patients who were already on statin and antiplatelets were excluded from those study. Baseline characteristics like age, sex, clinical history, conventional risk factors, duration of symptoms, type of thrombolytic agent used, and coronary angiogram results were analyzed in detail.

Statistical Analysis

The information collected regarding all the selected cases were recorded in a master chart. Data analysis was done with the help of computer by using SPSS 21.0 software. Using this software mean, standard deviation and ‘p’ value were calculated through Student ‘t’ test, one way ANOVA, Chi square test and correlation coefficient from Pearson correlation and P value of <0.05 was taken as significant.

Results

In this study, 70% patients were males, and 30% patients were females (Table 1) indicating high prevalence of Acute Coronary Syndrome in men.

Table 1: In our study there were 70 male patients and 30 female patients.

Sex	No. of patients	%
Male	70	70%
Female	30	30%
Total	100	100%

In this study there were 70 male patients and 30 female patients.

In this study, there were 54% patients between 40-60 years (Table 2) indicating high prevalence of ACS in 40- 60-year population. Mean age for male patients was 47.98 in female patients was 55.87 young patients (11%) were included in our study. The mean age of women was 41.47±11.34 years, in this study 60 (%) patients had AAMI (Table 3) indicating high prevalence of AAMI in STEMI. 37% patients had inferior wall MI

Table 2: Age Distribution

Age	No of patients
Below 30	1
30-40	10
40-50	19
50-60	35
60-70	21
Above 70	14

Table 3: Type of MI

Type of MI	Patients	%
AAMI	60	60%
IAMI	37	37%
LAMI	3	2%

In our study 35% patients had diabetes indicating Diabetes is one of the most common risk factors. The prevalence of diabetes in our study was 35%.

Diabetes is one of the common risk factors still need to be controlled in India. In our study patients 45% had hypertension indicating it's the one of the common causes for acute coronary syndrome

In our study 55% of the patients were smokers most (90%) of them were men

indicating high prevalence of ACS in smokers. Smoking accelerates the atherosclerotic process and provokes myocardial infarction in young patients.

In this study, patients had BMI 5% patients had BMI <25 kg/m², 65% patients had BMI between 25-30 kg/m², 30% of the patients had BMI between 30-40 kg/m² indicating CAD is more common in overweight patients than obese patients.

Table 4: BMI in acute coronary syndrome

BMI kg/m ²	No of patients	%
<25	5	5
25-30	65	65%
31-35	24	24%
>35	6	6%

In our study patients only 42% patients had Serum cholesterol more than 200mg/dl indicating serum cholesterol is not a significant to predict ACS.

Table 5: Serum cholesterol in acute coronary syndrome

Serum cholesterol	No. of patients	%
<200 mg/dl	58	58%
200-400	37	37%
>400 mg/dl	5	5%

In this study, 84% patients had TGL more than 200 mg/dl (Table 6) indicating TGL is more correlating with.

Table 6: Triglyceride level in acute coronary syndrome

Serum triglyceride (mg/dl)	No. of patients	%
<200 mg/dl	16	16%
200-400	73	73%
>400 mg/dl	11	11%

In this study, 30% patients had LDL more than 100 mg/dl (Table 7) indicating LDL is not a good predictor of ACS.

Table 7: Serum LDL cholesterol in acute coronary syndrome

LDL Cholesterol (mg/dl)	No. of patients	%
<100	72	72%
100-200	27	27%
>200	3	3%

In this study, 60% patients had NON-HDL more than 130 mg/dl indicating NON-HDL is more correlating with ACS.

Table 8: Non-HDL cholesterol in acute coronary syndrome

Non-HDL cholesterol	No of patients	%	P value
<100	20	20%	<0.001
100-130	22	20%	
>130	60	60%	

In this study, 10 patients had depression even though it's not a significant factor treating depression lowers the ACS risk. Authors should routinely include depression as a risk factor

In this study, 62% male patients had waist hip ratio more than >1 and in females 71% patients had waist hip ratio more than >0.85 and it found to be more correlating than BMI.

Discussion

The Inter Heart study identified abnormal lipids, smoking, hypertension, diabetes, abdominal obesity, psychosocial factors, consumption of fruits, vegetables, and alcohol, and regular physical activity account for most of the risk of myocardial infarction world-wide. Various other studies have also shown similar trends in the Indian population. Sanjay P. Zodpey, study also states high prevalence of ACS in

male patients. Prevalence of Diabetes was 16% in sekrhi study.[12,13] The prevalence of hyper cholesterolemia in sakrhi study[8] was 31.3%. An increasing prevalence of impaired glucose tolerance and diabetes in urban residents of Chennai was reported by Ramchandran et al, in 2002, Gupta et al, showed that smoking and low physical activity levels were widespread in 20–39-year-old urban adults.[14,15] Another important independent risk factor for CAD is a family history of CAD, as reported by Goel et al, in 2003.[16] In Jaipur Heart Watch-5 study by Gupta et al, That study found that 46.2% of men and 50.7% of women were overweight or obese.[15]

In this study, 70% patients were males and 30% patients were females indicating high prevalence of Acute Coronary Syndrome in men. In our study 35% patients had diabetes indicating Diabetes is one of the most common risk factors. The prevalence of diabetes in our study was 35%.

Similar results were found by a study by Prabhakaran et al among men working in an industry in northern India. A high serum total cholesterol/HDL ratio was found in 62% of the population, overweight in 47%, hypertension in 30% and diabetes in 15%.[17] Prabhakaran et al, also showed that 47% of their subjects had at least two CAD risk factors, compared with 78.6% with two or more CAD risk factors in the present study.

Another study in 2008 by Mohan and Deepa showed the following prevalences of major risk factors for cardiovascular disease: diabetes 11.9%, hypertension 25.4%, dyslipidemia 40.2%, hypertriglyceridemia 28.3%, overweight (BMI ≥ 23 kg/m²) 60.2% and metabolic syndrome 34.1%.[18]

In this study, patients had BMI 5% patients had BMI < 25 kg/m², 65% patients had BMI between 25-30 kg/m², 30% of the patients had BMI between 30-40 kg/m² indicating CAD is more common in overweight patients than obese patients.

India is experiencing an epidemiological transition with high rates of urbanisation.[19] This has led to economic improvement, the consequences of which are increased fast food consumption and tobacco usage and decreased physical activity. With the introduction of an era of refined foods, sugar and hydrogenated oils, the traditional high complex carbohydrate, high fibre and low fat diet has been replaced by a diet rich in fats and simple sugars low in dietary fibre.[20] More importantly, CAD is affecting young Indians who comprise the productive workforce. The incidence of CAD in young Indians is 12-16%, which is higher than in other ethnic groups worldwide.

Prevention and control of the risk factors for CAD can reduce the rate of CAD. This requires changes in the individual as well as at the community level. Modifying risk factors such as smoking, increased levels of body fat, consuming too much fat and salt, and a sedentary lifestyle together with the use of accessible and affordable preventive medicines, can lower the risk of CAD.

A substantial proportion of patients with coronary artery disease do not have traditional risk factors of the disease. The common risk factors of atherosclerosis explain disease occurrence in only half of the diagnosed cases. In only 40% patients, risk factors modification inhibits the progression of atherosclerosis. This necessitates a context-specific and holistic model to explain the occurrence of AMI, including searching for new risk factors of atherosclerosis. The present study identified[11] significant risk factors of AMI in the final model. These include conventional risk factors for coronary artery disease like obesity (estimated through waist-hip ratio and BMI), depression, hypertension, smoking, raised non HDL cholesterol.

Conclusion

Prevention and control of the risk factors for CAD can reduce the rate of CAD. This requires changes in the individual as well as

at the community level. Modifying risk factors such as smoking, increased levels of body fat, consuming too much fat and salt, and a sedentary lifestyle together with the use of accessible and affordable preventive medicines, can lower the risk of CAD.

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