

Original Article

Risk Factor Profile for Coronary Artery Disease Among Young & Elderly Patients in Chhattisgarh.

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Abstract

Background: Coronary artery disease (CAD) is a worldwide health epidemic. Acute coronary syndrome is a potentially life-threatening condition and patient may die or become disabled in the prime of life. The aim of this study is to determine the risk factors of CAD in young & elderly aged patients in Chhattisgarh. **Methods:** Total 180 CAD patients admitted in ICCU at CIMS, Hospital, Bilaspur were selected for the study. Among them, 80 were aged between 18 – 45 years, and 100 were more than 45 years of age. These patients were evaluated for conventional risk factor contributing to occurrence of CAD. The significance of each risk factor between the groups was calculated by using chi-square test and $p < 0.05$ was taken as significant. **Results:** The hypertension (20%), smoking (22%), diabetes mellitus (11%) and dyslipidemia (8%) were the commonest risk factors in young patients. Overall risk factors were more likely in males compared to females (18 to <45 years, 79%; ≥ 65 years, 69.1%). Regarding elderly patients, Diabetes Mellitus (21%), hypertension (14%) smoker (17%), kidney disease (11%) and dyslipidemia (9%) were the commonest risk factors. **Conclusion:** Young patients had a different risk factor profile when compared with older patients. Hypertension and smoking were the commonest risk factors in young patients of coronary artery disease. While Diabetes Mellitus, kidney disease and smoking were found in elderly patients.

Key words: Coronary artery disease, Diabetes mellitus, Hypertension, Smoking.

Introduction

Coronary artery disease is an emerging health problem in India, various risk factors contributing to increase prevalence of coronary artery disease in different age groups. Hypertension, diabetes mellitus, smokers & dyslipidemia are the most common cause of coronary artery disease ^(1,2). The high incidence of risk factor for coronary disease in young individuals is hypertension, where as diabetes is in with the elderly patients. In elderly patients aging is associated with changes in beta cell function and insulin resistance that predisposes to diabetes ^(3,4).

In the last few decades it has been in upsurge in the epidemiological study by World Health Organization population-based MONICA study⁽⁵⁾, INTERHEART^[6], Euroheart ACS epidemiologic studies⁽⁷⁾,

and India Heart Watch Study (2012)⁽⁸⁾ along with other randomized controlled trials have shown that certain risk factors and baseline characteristics, such as family history, obesity, dyslipidemia, and use of tobacco products, are more potent predictors of outcomes in the young than in their older counterparts.

CAD has a multi-factorial etiology, with many of the risk factors being influenced by lifestyle. Among the several CVD risk prediction models, Framingham Risk Score (FRS) developed in the US and the SCORE developed in Europe are the most widely used. Rapid change in dietary habits coupled with decreased physical activity in India as a consequence of urbanization may partly explain the escalation of CAD. India is at present experiencing an epidemiological transition with high rates of urbanization. This has led to economic improvement to the

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consequence of which is increased fast food consumption and tobacco usage and decreased physical activity. One of the effects of this transition is a shift in the disease spectrum from communicable to non-communicable diseases, particularly CAD and diabetes⁽⁹⁾. Thus, effective CAD control is necessary for the prevention of cardiac mortality and morbidity. Currently, there are very limited data available on prevalence of risk factors for CAD from Chhattisgarh. Keeping in view the facts, a preliminary study of risk factors in young and elderly patients of acute MI was planned. This is one of pioneer study focusing on the assessment of conventional risk factors for CAD in Chhattisgarh.

Materials and methods

A hospital based data analysis of 180 patients of acute MI admitted in ICCU, Department of Medicine, Chhattisgarh Institute of Medical Sciences Hospital, Bilaspur during the period January 2007 to December 2008. The Institution Ethics committee approval was taken prior to the study. Proforma was prepared that incorporated information name, age, sex, detail history of risk factor, and investigations. 180 patients were divided in two groups; Group 1: 20 - 45 years of age and Group 2 : more than 46 years of age (elderly patients). Complete detail history and examination were performed at bed side . At the time of admission and on the following day. Hypertension was classified based on the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure (JNC 7) classification for hypertension⁽¹⁰⁾. All patients were subjected for complete hematological and biochemical investigations including Troponin T, ECG to confirm acute MI. Among these patients coronary risk factors like smoking, Diabetes Mellitus, hypertension, dyslipidaemia, gender, kidney disease, alcohol history and also prior MI, heart failure and angina class were studied. The significance of each risk factor between the groups was calculated by employing the chi-square test and $p < 0.05$ was taken as significant.

Results

The patient characteristics of group 1 and group 2 as shown in table 1. Mean age of patients enrolled in this study was about 40.5 ± 4.1 for younger group and 56.4 ± 6 for elderly patients. Significant differences observed for different risk factors in both groups as shown in table 2. In this study, younger patients were considerably more likely to suffer from hypertension (20%), smoker (22%), dyslipidemia (8%), obesity (4%), diabetes mellitus (11%), and kidney disease(5%) detected at the time

of acute coronary events. Regarding age group more than 45 years, observed risk factors were diabetics (21%), hypertension (14%) and smoker (17%), dyslipidemia (9%), Obesity (8%) , kidney disease (11%) and alcohol intake (7%) (table 2). In addition, younger patients were more likely to be male; none of them were taking lipid-lowering drugs before infarction. At the time of MI, younger patients were less likely to be aware of their dyslipidemia, diabetes. Similarly 2.5% of younger patients who were previously not known to have diabetes were diagnosed with diabetes during presentation. Younger patients were having anterior infarction which was characterized by ST-segment elevation and were treated acutely with the thrombolytic and medical therapy.

Characteristics	Age group (Years)	
	18 to <45 years (n = 80)	>45 years (n = 100)
Age (y)	40.5 ± 4.1	56.4 ± 6
Female sex (n)	32	41
Male sex(n)	48	59
BMI (kg/m ²)	26.2 ± 6.3	28.5 ± 5.2
Systolic BP (mm Hg)	118.8 ± 13.4	122.1 ± 15.9
Heart rate (beat/min)	76.5 ± 12.2	86.4 ± 10.5
Hypertension (n)	16	14
Known diabetes before MI(n)	8	21
Dyslipidemia (n)	8	9
Smoking (n)	18	17
Obesity (n)	4	8
Anterior MI (n)	48	54

Table :1 – Baseline characteristics of the patient.

Discussion

Hypertension, smoking, and dyslipidemia were leading cause of deaths and other major hazardous outcome mainly attributed to smokers and dyslipdemia. There are numerous case-control studies exist in India. The largest of these case-control studies is the INTERHEART study⁽⁶⁾. This study was performed in 27 000 cases of acute myocardial infarction and controls in 52 countries of the world. This study reported that standard risk factors such as smoking, abnormal lipids, hypertension, diabetes, high waist-hip ratio, sedentary lifestyle, psychosocial stress, and a lack of consumption of fruit and vegetables explained more than 90% of acute CHD events in South Asians. Another study, the INTERSTROKE study⁽¹²⁾ reported 10 common risk factors explained more than 90% of incident hemorrhagic and thrombotic strokes, Similar conclusions were reached in smaller

Risk factor	Age 18 to <45	Age ≥45	P value
	(n = 80) years	(n = 100) years	
Diabetes mellitus	11%	21%	p<0.05
Hypertension	20%	14%	
Chronic Kidney Disease	5%	11%	
Physical inactivity	5%	12%	
Smoking	22%	17%	
Dyslipidemia	8%	9%	p>0.05
Elevated triglycerides			
Reduced HDL			
Elevated LDL			
Obesity (based on BMI)	4%	8%	
Alcohol consumption	5 %	6%	

Table :2 – Risk factors for coronary artery disease among young & elderly patients.

case-control studies⁽¹¹⁾. Recently, a case-control study by Panwar R B et al. showed that the thrombotic (smoking, low fruit/vegetables intake, fibrinogen, homocysteine) as well as atherosclerotic (hypertension, high fat diet, dyslipidemia) risk factors were important in premature coronary heart disease⁽¹³⁾.

Reviews of epidemiological studies suggest that all the major cardiovascular risk factors are increasing in India. In this study, most of young patients had risk factors like smoking, hypertension and dyslipidemia. Obesity noted to double the prevalence of cardiovascular disease in men and women under the age of 50 years, has been reported between 30% to 58% of younger patients^(14, 15, 16). Interestingly, a much higher percentage of young patients (almost 20%) were unaware of their hypertension, dyslipidemic status before the index MI and, thus, were not able to benefit from prior therapeutic interventions. Younger patients were more likely to have an MI as their first event (70.5%), whereas heart failure was a more common first event in older patients (60.5%). Importantly, the relative proportion of sudden death events was similar across age groups. We observed an age-dependent variation in hazard associated with smoking and hypertension, with greater relative hazard in the youngest cohort of patients. However Diabetes Mellitus and kidney disease were more prevalent in elderly patients in this study. The declining effect of individual risk factors with advancing age is likely because of the influence of competing risk factors. In contrast to their younger counterparts, elderly patients often presented with a more complex cardiovascular risk profile.

The individual risk factors contribute disproportionately to risk in younger patients underscores the importance of addressing modifiable risk factors in younger patients, as those risk factors present in younger patients appear to be associated with differentially greater risk⁽¹⁷⁻¹⁹⁾.

This male preponderance is remarkably consistent across 52 countries with hugely divergent rates of CAD mortality and lifestyles⁽²²⁾. This study concur with previous finding that overall risk factors are more likely in males compared to females. Our study showed that smoking is a major risk factor for CAD in both groups. The effect of cigarette smoking on coronary risk factors is pervasive. Unfavorable effects include enhancement of platelet function. Platelet activation by cigarette smoking is linked to thrombosis formation, including onset of myocardial infarction⁽²³⁾. Smoking is increasing among young subjects (20-35 years), according to second and third National Family Health Surveys (NFHS)⁽²⁴⁾. There were significant state-level and regional variations in smoking^(24, 25). The smoking rates were the highest in eastern Indian states and the lowest in Punjab⁽²⁶⁾. In urban populations, smoking is increasing among the low educational status subjects⁽²⁷⁾. This study also supports the claim that smoking rate is highly prevalent in central Indian subjects.

High Prevalence of hypertension (20% and 14% in young and elderly patients respectively) was seen among the both study population. This agrees with the previous studies by Sofia and EUROSPIRE, hypertension has been seen as a major risk factor for CAD⁽²⁸⁾. The prevalence of hypertension has increased in both urban and rural subjects and presently is 25%-40% in urban adults and 10%-15% among rural adults⁽²⁹⁾. A high incidence of diabetes was seen among the elderly population. Indians are genetically prone to develop type II diabetes mellitus due to insulin resistance. The hyperinsulinemia in these patients accelerates the atherosclerotic process in the coronary arteries. Diabetes is second only to CAD as a health burden in India. During the past decade, the number of people with diabetes in India increased from 32 million to 50 million, and the projected figure may reach 87 million by 2030⁽³⁰⁾. Hyperinsulinemia, insulin resistance, and the higher rate of prevalence of metabolic syndrome in people with type 2 diabetes were attributed to high coronary risk in south Asians^(31,32). Although there are large regional variations in the prevalence of diabetes it has more than quadrupled in the last 20 years from < 1%-3% to 10%-15% in urban areas and 3%-5% in rural areas⁽³³⁾.

In this study, the fasting lipid profile tests revealed evidence of dyslipidemia in 8% of the young patients and 9% of the elderly subjects. The importance of dyslipidemia in the pathogenesis of CAD is well-known. In a study conducted by Mohan et al. between 1998 and 2002 on a North Indian population showed that CAD occurred at much lower levels of total cholesterol and LDL-C than other populations, and high triglyceride and low HDL levels were of a universal phenomenon in this population⁽³⁴⁾. In another study from a north Indian city reported increasing mean levels of total, low density lipoprotein and non-high density lipoprotein (HDL) cholesterol and triglycerides, and decreasing HDL cholesterol⁽³⁵⁾.

In view of obesity as the risk factor for CAD, based on the BMI, only 4% of the young patients had a BMI higher than 30, whereas 8% of the elderly had a BMI higher than 30^[30]. Although most of the comorbidities relating obesity to CAD increase as BMI increases, they also relate to body fat distribution. It might indicate that obesity as such not only relates to but independently predicts coronary atherosclerosis. Additionally, studies have reported increasing obesity as well as truncal obesity due to sedentary lifestyles, and psychosocial stress in the country⁽³⁶⁾. Prevalence of overweight and obesity was the highest in southern and northern Indian states and the lowest in central Indian states⁽³⁷⁾. Our study also had showed that elderly patients with chronic kidney disease (CKD) had an 11% prevalence of coronary artery disease (CAD). In 1998, the U.S. National Kidney Foundation Task Force on Cardiovascular Disease in Chronic Renal Disease recommended that patients with CKD be considered to belong to the highest risk group for the development of cardiovascular events⁽³⁸⁾. These patients present unique challenges to physicians attempting manage concomitant ischemic heart and CKD.

On the other hand, reviews of CVD risk factor epidemiological studies from India showed significant regional variations in the prevalence of the important CVD risk factors of smoking, obesity, hypertension, diabetes and lipid abnormalities. There are a few studies regarding regional variations of prevalence of cardiovascular risk factors in India. An Indian Council of Medical Research (ICMR) study in the 1990s evaluated risk factors in Delhi in north India and Vellore in south India and reported a significantly greater prevalence of risk factors in north India⁽³⁹⁾. A multisite study involving 5 rural and 4 urban sites in middle-aged women reported the prevalence of cardiovascular risk factors in different regions of India⁽⁴⁰⁾. The results focused on assessment of urban-rural differences and not on regional variations. An ICMR surveillance study evaluated the differences in

self-reported prevalence of behavioral and anthropometric cardiovascular risk factors in different Indian states in rural and urban populations⁽⁴¹⁾. Epidemiological studies were performed in urban and rural populations in different states of India. The prevalence of smoking was highest in Mizoram and overweight/obesity, hypertension and self-reported diabetes highest in the south Indian states of Kerala and Tamilnadu.

The INTERHEART study reported that these biochemical risk factors explained more than 50% of cardiovascular events among South Asians⁽⁶⁾. Based on the earlier studies conducted in India and also there are limited data pertaining to central Indian population, this preliminary study was planned and focused on conventional risk factors. This was one of the pioneer studies conducted in central Indian population. Thus, the current study is broadly consonant with the INTERHEART study⁽⁶⁾. However, this study was confined to a small population in central India and had several limitations. It is widely believed that the association of these risk factors with CAD in different populations needs to be ascertained, and there is speculation that differences might range from the frequency of presence of classical risk factors to their total absence or irrelevance in these populations. Therefore, it is imperative to undertake large population-based, prospective studies in developing countries such as India to identify CAD risk factors, both conventional and novel. There are many emerging risk factors [lipoprotein (a), triglyceride remnants, lipid subtypes, insulin resistance, C-reactive protein, inflammatory factors] or genetic markers that have been implicated in premature CHD, were not studied.

However, careful scrutiny of available scientific evidence for modifiable CAD risk factors (elevated serum total and low-density lipoprotein cholesterol [LDL-C], low high-density lipoprotein cholesterol [HDL-C], smoking, diabetes, hypertension, low level of physical activity, and obesity) in this population may be helpful in formulating a more immediate CAD prevention strategy. A cost-effective preventive strategy is needed to focus on reducing risk factors both in the individual and in the population at large. The findings highlight the need for policy makers to develop strategies to cost-effectively screen the general population for high blood pressure, dyslipidaemia, diabetes and implement smoking cessation programmes, if necessary, offer affordable treatment to reduce the burden of CHD deaths. Additionally, policies to promote primordial prevention strategies in India such as regulation against tobacco use and promotion of protective lifestyle factors such as leisure time physical activity and

regular intake of fruits and vegetables which are markedly lower among South Asians compared to western population.

Conclusion

The study highlighted that conventional factor like hypertension, smoking, diabetes mellitus, obesity, and dyslipidemia as potential targets. Younger patients had a different risk factor profile in comparison with older patients. These risk factors were highly prevalent in the community. Prevention and control of premature cardiovascular diseases in India needs urgent control of these factors. Improving lifestyles with tobacco cessation, diet modulation with more fruits and vegetables and lower fat intake, and increased physical activity are critical. Target oriented control of hypertension, lipid levels and glycaemia is required.

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