Detection of ischaemic heart disease with risk factors in different categories of employees of University Grants Commission

Syed Ali Ahsan[1], K.M.H.S. Sirajul Haque[1], Mohammad Salman[1]
Ahmed Saiful Bari[1], Habiba Nahar[1] , Md. Khurshed Ahmed[1], Md. Harisul Hoque[1], Md. Mukhlesur Rahman[1]
Md. Aslam Hossain[2], Md. Ashraf Uddin Sultan[1]

[1]Department of Cardiology, Bangabandhu Sheikh Mujib Medical University, Dhaka
[2]Department of Cardiac Surgery, Bangabandhu Sheikh Mujib Medical University, Dhaka

Address for correspondence
Dr. Syed Ali Ahsan, Associate Professor, Department of Cardiology, Bangabandhu Sheikh Mujib Medical University, Dhaka.

E-mail : draliahsam@yahoo.com

Abstract

Coronary artery disease is the major cause of mortality world wide. The potentially modifiable risk factors for coronary artery disease were increased concentrations of low density lipoprotein cholesterol, decreased concentrations of high density lipoprotein cholesterol, hypertension, hyperglycemia, and smoking.This cross sectional study which included all UGC employees was conducted in the department of cardiology of BSMMU between January 2007 and December 2007. Detailed clinical history, family history, lifestyle, smoking habit, diabetes mellitus, and hypertension, regular use of any medication or any previous cardiac intervention was taken. Physical examination, Blood pressure measurement, ECG, Echocardiography, fasting blood sugar and fasting lipid profile was done to all subjects.163 subjects (all UGC employees), mean age 44.8±8.3 years were included in this study. (20.9%) presented with angina pectoris, 3.7% were having palpitation, and 8.6% were having shortness of breath and 5.5% with nonspecific chest pain. 16.6% subjects presented with hypertension, 12.3% with diabetes mellitus, and 20.9% with dyslipidemia. 3.1% subjects had previous myocardial infarction. ECG shows 8.0% subjects had inferior ischemia, 6.1% had anterior ischemia and 2.5% had bundle branch block. Echocardiography shows 4.9% subjects were having regional wall motion abnormalities Prevalence of risk factors for CAD is increasing, and with the clinical and cost burdens mounting, identifying and treating those at risk remains a national priority.

Abbreviations UGC, University Grants Commission, BSMMU, Bangabandhu Sheikh Mujib Medical University.

Introduction

Atherosclerosis leading to coronary heart disease is complex in origin. Involved in the pathogenesis of atherosclerosis are hemodynamic, thrombotic, and carbohydrate–lipid metabolic variables, along with intrinsic characteristics of the arterial wall[1]. These physiologic and biochemical factors underlie the clinical events that may eventually occur. Environmental factors such as smoking or a sedentary lifestyle also contribute to this process. The progression of atherosclerotic disease and the increasing severity of atherosclerosis relate not only to the presence and extent of cardiovascular risk factors but also to the persistence of risk factors over time[2, 3.] Sudden death may occur in a young person with only a single lesion complicated by a coronary thrombus, without extensive vessel disease. Consequently, the extent of vascular lesions may not be directly related to the occurrence of clinical events, such as myocardial infarction. Morbidity due to coronary artery disease, however, is generally related to the extent of vascular lesions[4]. In this regard, clinical risk factors are considered to be useful in predicting the severity of atherosclerosis[5].

Epidemiologic studies have established that multiple risk factors increase the probability of cardiovascular events, since cardiovascular risk factors tend to reinforce each other in their influence on morbidity and mortality[6]. Although a specific risk factor influences the risk that a person will have cardiovascular disease, risk factors tend to aggregate and usually appear in combination.

The past decade has witnessed major strides in the prevention of coronary artery disease (CAD) through modification of its causes. The most dramatic advance has been the demonstration that aggressive medical therapy will substantially reduce the likelihood of recurrent major coronary syndromes in patients with established CAD (secondary prevention). A similar potential exists for risk reduction in patients without established CAD (primary prevention).[7]

In this survey we tried to find out of presence of risk factors of coronary artery disease among the University grants commission (UGC) employees. Coronary angiography is the invasive tool to assess the atherosclerotic burden but it is not feasible in asymptomatic patients. So we tried to do the indirect assessment of the coronary atherosclerosis in UGC employees by assessing the coronary risk factors in all age group.

Methods

This study was conducted in the department of Cardiology BSMMU. In this cross sectional survey, UGC employees were enrolled between January 2007 and December 2007. After taking informed consent a detailed history regarding cardiac symptoms such as chest discomfort on exertion, family history of cardiovascular disease, lifestyle whether sedentary or active, smoking habit, diabetes mellitus, hypertension, regular use of any medication or any previous cardiac intervention was taken. Sedentary life style was defined as any activity less 30 minutes of moderate intensity (brisk walking, gardening) if not all but most of the days of the week.[8] Blood pressure was measured in right arm and an average of two readings taken 5 minutes apart was considered the blood pressure of the subject. Systolic blood pressure more than 140 mm Hg and diastolic blood pressure more than 90 mm Hg was taken as hypertension. Fasting blood sugar more than 7 m.mol/l was taken as diabetes mellitus. Dyslipidemia was defined as elevation of the serum total cholesterol, low-density lipoprotein (LDL) cholesterol and triglyceride (TG) concentrations, and a decrease in the high-density lipoprotein (HDL) cholesterol concentration or the patient is taking lipid lowering drugs. Electrocar diography (ECG) and echocardiography (2D and M mode) was done in all subjects. Fasting blood glucose and fasting lipid profile was done by standardized procedure in the biochemistry laboratory of BSMMU.

Statistical analysis

Statistical analysis was done by SPSS (Statistical package for social sciences) version 12 for Windows. All the data were expressed as mean, standard deviation, number and percent as appropriate.

Results

163 subjects (UGC employees) enrolled between January 2007 and December 2007 was included in this study. Age of the subjects was Mean±SD (44.8±8.3) years. 149 (91.4%) subjects were male and 14 (8.6%) were female.

Table I: Basic characteristics of the subjects (N=163)

Symptoms	Frequency	Percentage
Stable angina	34	20.9
Palpitation	6	3.7
Shortness of breath	14	8.6
Non specific chest pain	9	5.5
No Complaint	100	61.3

Results were expressed in Mean±SD and percent as appropriate.

68 (41.7%) subjects were in the age group of 31-40 years, 37 (22.7%) were in the age group of 41-50 years and 58 (35.6%) were in the age group of 51-60 years.

Table II: Clinical presentation of the subjects

Variables	Frequency	Percentage	Mean±SD	Minimum	Maximum
Age (in years)	163		44.8±8.3	31	60
Male	149	91.4			
Female	14	8.6			

Results were expressed in number and percent.

34 (20.9%) were presented with angina pectoris, 6 (3.7%) were having palpitation, 14 (8.6%) were having shortness of breath, 9 (5.5%) were presented with nonspecific chest pain where as 100 (61.3%) subjects were having no complaints.

Pie chart showing the smoking habit among the UGC employees
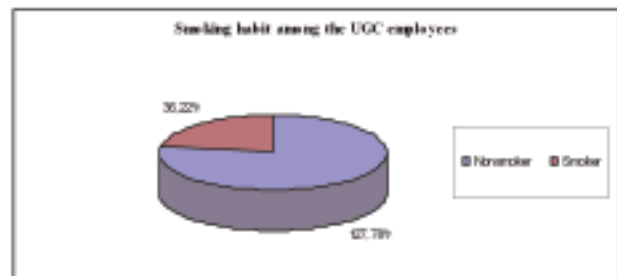
Pie chart showing the smoking habit among the UGC employees. 36 (22%) of the subjects were the smokers.

Table III: Frequency of different clinical conditions detected in UGC employees (N=163)

Variables	Frequency	Percentage
Hypertension	27	16.6
Diabetes mellitus	20	12.3
Dyslipidemia	34	20.9
Myocardial infarction	5	3.1

Results were expressed in number and percent.

We found, 27 (16.6%) subjects were having hypertension, 20 (12.3%) were having diabetes mellitus, 34 (20.9%) having dyslipidemia. 5 (3.1%) subject were detected with previous myocardial infarction.

Table IV: Lipid parameters in subjects with and with out dyslipidemia

Lipid parameters	Subjects with out dyslipidemia (Mean±SD)	Subjects with dyslipidemia (Mean±SD)
Total cholesterol	164±37.9	190±38.6
Triglyceride	142.6±60.1	171±69.2
High density lipoprotein (HDL)	43.7±3.4	33.9±3.6
Low density lipoprotein (LDL)	89.5±35.6	121.39.5

All the date expressed in mean and standard deviation.

Table IV shows that all lipid parameters were higher in the subjects with dyslipidemia.

Table V: Electrocardiography findings of the UGC employees (N=163)

ECG findings	Frequency	Percentage
Inferior ischemia	13	8.0
Anterior ischemia	10	6.1
Myocardial infarction	5	3.1
Bundle branch block	4	2.5
Normal	131	80.4

Results were expressed in number and percent.

In this study we found 13 (8.0%) subjects were having inferior ischemia, 10 (6.1%) were having anterior ischemia, 4 (2.5%) were having bundle branch block whereas 131(80.4%) were found with normal ECG.

Table VI: Echocardiographic findings of the UGC employees (N=163)

Echocardiographic findings	Frequency	Percentage
Regional wall motion abnormalities (RWMA)	8	4.9
Septal hypertrophy	7	4.3
normal	148	90.8

Results were expressed in number and percent.

8 (4.9%) subjects were having regional wall motion abnormalities, 7 (4.3%) were having septal hypertrophy and 148 (90.8%) were found with normal echocardiography findings.

Table VII: Different class of drugs used by UGC employees (N=163)

Name of the drug	Frequency	Percentage
Angiotensin converting enzyme inhibitor (ACEI)	8	4.9
Beta blocker	18	11.0
Calcium channel blocker (CCB)	7	4.3
Oral hypoglycemic drugs	14	8.6
Insulin	3	1.8
No drug used	113	69.3

Results were expressed in number and percent.

In this study 8 (4.9%) subjects were using ACE inhibitor, 18 (11%) were using beta blockers and 7 (4.3%) were on calcium channel blockers. We found 14(8.6%) were on oral hypoglycemic drugs and 3 (1.8%) were getting insulin. 113 (69.3%) were not using any medication.

Discussion

CAD is the leading cause of death in all World Bank developing regions, with the exception of sub-Saharan Africa9.The major and independent risk factors for coronary artery (CAD) are cigarette smoking of any amount, elevated blood pressure, elevated serum total cholesterol and low-density lipoprotein cholesterol (LDL-C), low serum high-density lipoprotein cholesterol (HDL-C), diabetes mellitus,

and advancing age. The quantitative relationship between these risk factors and CAD risk has been elucidated by the Framingham Heart Study[7]. UGC employees are mostly sedentary workers. Modifiable risk factors like smoking were common in them. There are more than one billion smokers worldwide, and 80 percent of them reside in developing countries.[10] Nearly one-third of all tobacco users in the developing world die from CAD.[10] Most of the subjects in this survey were male and male sex is more prone to develop coronary artery disease. In this study we found a considerable proportion of the subjects were having angina pectoris. In accord, the recent Framingham report7 also provided estimates for "hard" CAD, excluding angina pectoris. The inclusion of coronary insufficiency (unstable angina) and unrecognized myocardial infarction (defined by electrocardiography) probably gives estimates of hard CAD that are somewhat higher than combined end points reported in several clinical trials.[11,12,13,14]

In this survey we found large proportion is having hypertension, dyslipidaemia and diabetes mellitus. Diabetes mellitus is a major risk factor for CAD is well established.[7] Both type 1 diabetes[15] and type 2 diabetes[16] confer a heightened risk for CAD. Type 2 diabetes is of particular concern because it is so common and usually occurs in persons of advancing age, when multiple other risk factors coexist. There is a growing consensus that most patients with diabetes mellitus, especially those with type 2 diabetes, belong in a category of high short-term risk. When the risk factors of diabetic patients are summed, their risk often approaches that of patients with established CAD.[17] Dyslipidaemia is a recognized risk factor for CAD. In this survey we included dyslipidaemia rather than low HDL-C and high LDL-C as in some report hypertriglyceridemia is correlated with other risk factors[18] ; however, its degree of independent predictive power is difficult to assess. Several clinical trials[19,209,21] found that drugs that primarily affect triglyceride-rich lipoproteins reduce CAD risk when used with patients with hypertriglyceridemia. Elevated triglycerides consequently may become a target of therapy independent of LDL-C lowering. In this survey we found 3% subjects were having myocardial infarction in this group secondary prevention for CAD is mandatory. The highest groups at risk for death among initial survivors of AMI are those with congestive heart failure (CHF). The prognosis for those with established CHF is generally poor and worse than for most malignancies or AIDS, with a five-year mortality of 26–75 percent overall and one-year mortality rate as high as 40 percent for those at the most advanced stage.[22]

Four generic medicines—aspirin, beta-blockers, cholesterol reducers (in particular, statins), and ACE inhibitors —have been the mainstay of treatment for those with coronary heart disease in the developed world. A combination of aspirin and atenolol was cost saving when compared to no therapy in all developing regions.

Conclusion

A global CAD epidemic is rapidly evolving, and the burden of disease is shifting. Three times as many deaths from CAD now occur in developing countries as compared with developed countries.[23] The economic and social costs of this burden will be great, particularly because many developing nations are still grappling with poverty-related diseases such as malnutrition, infectious diseases, and poor health care facilities. However, a broad range of individual- and population-based strategies exists at affordable prices and, if implemented, could reduce the burden of CAD disease by more than half. Reductions in tobacco use should be the cornerstone of these interventions. Simultaneously, efforts can be adopted to prevent the further development of CAD risk factors. This survey was done in a small group of UGC employees but it reflected the image of CAD in the society. It is a challenge to our intellect and enterprise to apply our knowledge creatively and cost-effectively to minimize the burden of cardiovascular disease.

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