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Original Research Article

A Case Control Study on Various Risk Factors Causing Coronary Artery Disease among Patients of Selected Hospital, Bangalore

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ABSTRACT

Background: Coronary heart disease is still leading cause of death in developing as well as in developed countries. Incidence and prevalence of coronary heart disease increase progressively with risk factors.
Objective: Current study was taken with the objective to find out the risk factors for coronary disease.
Methods: Case control design was chosen for this study at Vikram hospital**,** Bangalore.
Sample: Case: 20 patients diagnosed with CAD who were there at the time of data collection under random selection
Control: 20 pair matched subjects who were admitted in hospital other than CAD under random selection.
Analysis; Odd ratio (OR) and z test was calculated.
Results; Among 40 cases the findings of the study showed that low density lipoprotein >130 mg/dl (80% OR 76) hypertension (OR 36), overweight (OR 36) and tobacco consumption-smoking (OR 32), chewed (OR 51) were the most prevalent and significant cardiovascular risk factors. As age increases, incidence of CAD also increases. But the percentage of subjects in age group 35-50 (15%) is also alarming and it should be evaluated and managed if there is any sort of symptom or the presence of risk factor.
Conclusion: These risk factors are essential risk factors of CAD and the incidence can be reduced with the improvement in health education, early diagnosis with effective healthy life style pattern and medical management.

Key Words: Risk factors, Coronary artery disease, Case control study, Odd ratio

INTRODUCTION

Coronary artery disease (CAD), one of the non-communicable diseases has become a major public health problem in many developing countries. About two-third of the global estimated 14.3 million annual coronary artery disease death occur in the developing world. By the year 2015, cardiovascular diseases could be the most important cause of mortality in India. The prevalence of coronary artery disease in India increased from 1% in 1960 to 9.7% in 1995 in urban populations, and in rural populations it has almost doubled in the last decade. There is an epidemiological transition from infective to degenerative diseases. This transition is due to the increase in the prevalence of cardiovascular

risk factors, and ageing of the population, which eventually leads to an increase in the absolute numbers of people with coronary artery disease and increases the demand for health care facilities and health awareness. [1]

Current projections suggest that by the year 2020, India will have the largest cardiovascular disease burden in the world. One fifth of the deaths in India are from coronary artery disease. It will account for one third of all deaths. Many of these Indians will be dying young. Heart disease in India occurs 10 to 15 years earlier than in the west. There are an estimated 45 million patients of coronary artery disease in India. An increasing number of young Indians are falling prey to coronary artery disease. With millions hooked to a roller-coaster lifestyle, the future looks even more grim. [2] In a 2005 survey, most respondents 92% recognized chest pain as a symptom of a heart attack. **Only 27%** were aware of all major symptoms and knew to call emergency when someone was having a heart attack. **About 47%** of sudden cardiac deaths occur outside a hospital. This suggests that many people with heart disease don't act on early warning signs. [3]

Cardiovascular diseases, currently is a leading cause of death in India, atherosclerotic changes begins in the early ages and progress to great extent during adolescence. Physical inactivity, unhealthy habits, eating fast food, unhealthy competition and stress make people vulnerable to coronary artery disease. Hence, the investigator has decided to do case control study to assess the relative risk for cardiovascular diseases based on investigations of selected risk factors to take further preventive steps to control the disease.

MATERIALS AND METHODS

The study has taken with the objectives of to identify the various risk factors of coronary artery disease in cases among subjects at selected hospital, Bangalore, to identify the various risk factors of coronary artery disease in control among subjects at selected hospital, Bangalore and to estimate the odd ratio and their significance among cases and controls.

Hypothesis

H1: There will be an association between various risk factors and coronary artery disease.

Research approach and design: A case control approach was adopted to study the various risk factors causing coronary artery disease. The research design that was chosen for this study was case control design. The study was conducted in Vikram hospital, Bangalore.

Target population: Cases consists of patients diagnosed with CAD and control consists of matching clients unaffected with CAD.

Accessible population: Cases consist of patients diagnosed with CAD and controls consist of matching clients unaffected with CAD, who fulfill the inclusion criteria and who were present at Vikram hospital during the period of study.

Sample:

Case: Patients with CAD who were there at the time of data collection and who fulfill sampling criteria.

Control: Matched out patients who doesn't have CAD and fulfill the inclusion criteria.

Sample size:

The sample size of this study was:

Case: 20 patients who are diagnosed with CAD. ***Control:*** 20 matched patients without CAD.

Sampling technique:

Case: Simple random sampling technique was used. ***Control:*** Controls are chosen randomly who were matching with the case group

DESCRIPTION OF TOOL:

The tool consists of three sections,

Part A: A structured baseline data used to find out the demographic variables such as age, sex, lifestyle, socio economic status, dietary pattern and regular physical activity.

Part B: An interview questionnaire is used to explore the patients' risk factors like family history, gender, alcohol, smoking,

tobacco usage, hypertension, diabetes, diabetes with hypertension and overweight.

Part C: Patient's case files for lipid profile (Total Cholesterol, HDL, LDL, Triglycerides)

Inclusion criteria:

Case: Patients who are diagnosed with coronary artery diseases.

Control: Patients matching with CAD patients and who doesn't have coronary artery disease.

Data collection: The study was conducted during the month of November 2014. Samples were selected in accordance with laid down criteria's. The investigator found 20 patients admitted in the Vikram hospital, they were selected as case group and another 20 matched patients from out-patient department were selected as control group. Structured baseline data was administered to obtain demographic variable and interview questionnaire was used to obtain risk factors. Patient's case files were referred for lipid profile. After the data collection each patient was thanked and prevailing doubts were clarified.

Statistical Analysis: Collected data were coded and carried out by using statistical methods of descriptive, odd ratio and Z value.

Ethical Clearance:

The study was approved by the institutional scientific and ethics committee and the same to Vikram hospital. Each patient signed an informed consent after accepting to be enrolled in the study.

RESULTS AND DISCUSSION

Table 1: Frequency distribution of case group and control group with respect to their variables

Demographic variables	CASE (N=20)		CONTROL (N=20)		Chi square
	Frequency	Percentage	Frequency	Percentage	
Age in years					
35-50	3	15	5	25	0.654
50-65	14	70	12	60	0.721
65 & above	3	15	3	15	
Gender					
Male	13	65	13	65	0
Female	7	35	7	35	1.00
Life style					
Sedentary	12	60	12	60	0.290
Moderate	5	25	6	30	0.864
High activity	3	15	2	10	
Social class					
Upper class	12	60	14	70	0.796
Middle class	7	35	5	25	0.671
Lower class	2	10	1	5	
Physical activity					
Yes	4	20	5	25	0.143
No	16	80	15	75	0.704
Dietary pattern					
Vegetarian	1	5	3	15	4.030
Non-vegetarian	16	80	17	85	0.133
Eggetarian	3	15	0	0	

The major number of cases were present in the age group of 50-65 years (70%), followed by 65 >years (15%), while other 15% of the cases had faced their CAD between the age of 35-50 of their life. While doing sex-wise analysis, main was observed in males 65% than females. In relation to the physical activity it is found that 80% of them had no physical activity and similarly found that 80% of them associated with non vegetarian dietary pattern. 60% of them class were connected with sedentary life style and 60% to 70% of them belong to upperclass.

This findings is correlated with the study was conducted on "Cardiovascular disease factor awareness in American Indian communities: The strong heart study" in July 1993, among 46 to 80 years age group and concluded that awareness of risk factors of cardiovascular disease range from 70% to 90%. 90% identified obesity, 88% hypertension, 87% smoking, 85% decreased physical activity, 84% high cholesterol,

84% high fat diet, 82% stress/anxiety, 76% diabetes, 70% family history as risk factors for coronary heart disease. [4]

Table 2: Distribution of subjects according to their coronary heart disease risk factors

Risk factors	Case (n=20)		Control (n=20)		Odd ratio	Z value	P value
	n	%	n	%			
Family history							
Yes	12	60	1	5	28.5	2.983	0.0029*
No	8	40	19	95			
Gender							
Male	13	65	13	65	1	0.000	1.000
Female	7	35	7	35			
Alcohol							
Yes	12	60	2	10	13.5	2.978	0.0029*
No	8	40	18	90			
Tobacco usage(Smoking)							
Yes	17	85	3	15	32.11	3.917	0.0001*
No	3	15	17	85			
Tobacco usage (Chewed)							
Yes	18	90	3	15	51	4.039	0.0001*
No	2	10	17	85			
Hypertension							
Yes	18	90	4	20	36	3.846	0.0001*
No	2	10	16	80			
Diabetes							
Yes	17	85	5	25	17	3.491	0.0005*
No	3	15	15	75			
Hypertension +Diabetes							
Yes	18	90	5	25	27	3.635	0.0003*
No	2	10	15	75			
Overweight							
Yes	16	80	2	10	36	3.846	0.0001*
No	4	20	18	90			

*P < 0.05 significant

The present study was planned as hospital based case-control study to assess the role of various behavioral risk factors in the occurrence of coronary artery disease. A total of 40 subjects (20 cases and 20 controls) were studied. In current study high numbers (60% cases) had the family history of CAD and significantly higher than in controls (5%). The calculated odd ratio is 28.5, this indicates that family history is 28.5 times risk for developing CAD among cases.

Among the total of 40 subjects, in both the groups 65% were males and 35% were females, significant findings are not found with OR of 1

There is irrefutable evidence that tobacco (smoking, chewed), are a major risk factor of CAD. In relation to smoking significant findings were observed in (85% cases, 15% controls) with the OR of 32 and in tobacco chewed consumption (90% cases, 10% controls) with the OR of 51. A significant finding was also observed between alcohol drinking and CAD with the OR of 13.5.

Subjects diseased with hypertension, the risk of developing CAD is OR of 36. While with diabetes the risk is 17 (OR 17) and furthermore when compared with people who had both diseases were significantly higher in controls (90%) than in cases (25%) with the risk of 27 times. While doing obese wise analysis 80% of them were noted in cases, this was significantly higher than controls (10%). Findings of OR 36 indicate that physical inactivity is associated with an increased risk of CAD.

The finding of the present study is correlated with case control study on risk factors for acute myocardial infarction

(AMI) in Indians. They conducted a prospective hospital-based case-control study of 200 cases with a first (AMI) and 200 age and sex matched controls. They recorded prevalence of the following risk factors for IHD: diet, smoking, alcohol use, socioeconomic status, waist to hip ratio (WHR), blood glucose, serum insulin, oral glucose tolerance test, and lipid profile. The most important predictor of AMI was smoking OR 3.6. History of hypertension and of overt diabetes mellitus were also independent risk factors (OR 2.69 and 2.64). FBS, OR 1.62. Abdominal obesity (as measured by WHR) was OR 2.24. Compared with individuals with no risk factors, individuals with multiple risk factors had greatly increased risk of AMI (eg, OR of 10.6 for the group with smoking and elevated glucose). They concluded as Smoking cessation, treatment of hypertension, and reduction in blood glucose and central obesity may be important in preventing IHD in Asian Indians. [5]

Table 3: Distribution of study subjects according to Lipid Profile

Risk factors	Case n= 20		Control n = 20		Odd ratio	Z value	P value
	N	%	N	%			
Total Cholesterol							
>200mg/dl	12	60	5	25	4.5	2.182	0.029*
<200mg/dl	8	40	15	75			
HDL							
< 35mg/dl	16	80	1	5	76	3.707	0.0002*
>35mg/dl	4	20	19	95			
Low density lipoprotein							
> 130 mg/dl	16	80	1	5	76	3.707	0.0002*
<130mg/dl	4	20	19	95			
Triglycerides							
>150mg/dl	16	80	2	10	36	3.846	0.0001*
<150mg/dl	4	20	18	90			

***P < 0.05**

A total of 40 subjects among both cases and controls, (20 cases and 20 controls) were studied for lipid profile. Parameters that showed significant findings of odd ratio were respectively. Total cholesterol OR=4.5, High density lipoprotein OR=76, Low density lipoprotein OR=76, and Triglycerides OR=36 Findings state that there is a relative importance of these markers and the risk of coronary artery diseases and this finding is also interrelated with the finding of study conducted to determine the prevalence of lipid and lipoprotein abnormalities and their association with the risk of a first acute myocardial infarction (AMI) among Asians. Among both cases and controls, mean low-density lipoprotein cholesterol (LDL-C) levels were about 10 mg/dl lower in Asians compared with non-Asians. A greater proportion of Asian cases and controls had LDL-C ≤100 mg/dl. High-density lipoprotein cholesterol (HDL-C) levels were slightly lower among Asians compared with non-Asians. There was a preponderance of people with low HDL-C among South Asians However, despite these differences in absolute levels, the risk of AMI associated with increases in LDL-C and decreases in HDL-C was similar for Asians and non-Asians. Among South Asians, changes in apolipoprotein (Apo) A1 predicted risk better than HDL-C. ApoB/ApoA1 showed the strongest association with the risk of AMI. They concluded that the preserved association of LDL-C with risk of AMI among Asians, despite the lower baseline levels, suggests the need to rethink treatment thresholds and targets in this population. The low HDL-C level among South Asians requires further study and targeted intervention [6]

So findings suggests that there is a significant ($p < 0.05$) association between

various risk factors and coronary artery disease. However, since the sample size was of our study was small these findings need to be probed further to check whether these findings were applied to general population.

CONCLUSION

The findings of the study showed that low density lipoprotein >130 mg/dl (80% OR 76) hypertension (OR 36), overweight (OR 36) and tobacco consumption-smoking (OR 32), chewed (OR 51) were the most prevalent cardiovascular risk factor. These risk factors are essential risk factors of CAD and the incidence can be reduced with the improvement in health education, early diagnosis with effective healthy life style pattern and medical management. As age increases, incidence of CAD also increases. But the percentage of subjects in age group 35-50(15%) is also alarming and it should be evaluated and managed if there is any sort of symptom or the presence of risk factor.

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