STUDY OF RISK FACTORS FOR ISCHEMIC HEART DISEASE.

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ABSTRACT

INTRODUCTION: Ischemic heart disease is the leading cause of death. Commonest cause of IHD is atherosclerotic coronary artery disease (CAD).Cardiovascular risk factors are connected to each individual's personal characteristics, lifestyle habits that damage the arteries and lead to arteriosclerosis. Some of these factors cannot be altered, such as age, sex etc but patients must pay special attention to preventing and controlling of other factors. More than 90% of IHD cases occurred in those who had atleast one risk factor. The main objective of this study was to find out the risk factors for ischemic heart disease.

METHOD: The study was conducted for a period of 2 years from 2010 to 2012.The study was conducted in the Department of Medicine, Pt. J.N.M. Medical College and Dr. B.R.A.M. Hospital, Raipur. In our study, 103 patients of ischemic heart disease were included. Detailed clinical history was recorded including age, sex, presenting complaints, past, personal (including history of smoking, hypertension, and diabetes mellitus) and family history of ischemic heart disease. Congenital heart disease, Hypertrophic obstructive cardiomyopathy and Myocarditis, Pericarditis cases were excluded. Informed consent form was taken from all the participants included in the study.

RESULT: Out of 103 patients of IHD of study, 95, (92.23%) had risk factors present in the form of hypertension, diabetes mellitus, smoking, dyslipidemia or family historyof premature heart disease. Among 8 patients having no predisposing risk factors for Ischemic Heart Disease, 1 had single vessel disease; one had double vessel disease, i.e. 12.5% each, while rest 6 had normal coronaries i.e. 75%. No patient among this group had triple vessel disease. Hypertension was present in 56.84% of patients having risk factors, Diabetes Mellitus was found in 39 patients i.e. 41.05%. Smoking was present in 54 patients of total 103 patients of study (56.84%).

CONCLUSION: Most of the patients with coronary artery disease have atleast one of the risk factors. Many CVD risk factors are controllable through particular preventative interventions, providing potential to minimize the CVD burden.

KEYWORDS: **RiskFactors, Ischemic Heart Disease, Hypertension, Diabetes**,

INTRODUCTION: Ischemic heart disease (IHD) is defined as myocardial impairment due to imbalance between coronary blood flow and myocardial requirement. The commonest cause of IHD is atherosclerotic coronary artery disease (CAD). Prevalence is even higher in South India (13% urban & 7% rural). In 1990, 25% deaths in India were attributed to cardiovascular disease compared to 9% due to diarrheal disease, 12% due to respiratory infection and 5% due to Tuberculosis[1].

Itcommonly presents as myocardial infarction, stable angina and unstable angina. In India, the prevalence rate of coronary heart disease in urban areas is 6.4%, 6.1% for males while 6.7% for females. Prevalence rate is 2.5% in rural areas, 2.1% in males and 2.7% in females.[2]

Patients with ischemic heart disease fall in two groups, patients with chronic coronary artery disease who mostly present with stable angina and patients with acute coronary syndromes who present as acute myocardial infarction with ST-segment elevation on their presenting electrocardiogram and those with unstable angina and non-ST-segment elevation myocardial infarction.[3]

With urbanization in the developing world, the prevalence of risk factors IHD is increasing rapidly in these regions and so a majority of the global burden of IHD is now occurring in low income and middle income countries. Population subgroups that appear to be particularly affected are men in South East Asian countries, especially India.[4]

Large-scale observational studies have demonstrated each 5 mmHg higher level of diastolic blood pressure (or 10 mmHg higher level of systolic blood pressure) to be associated with an approximately one-third greater risk of stroke and one-fifth greater risk of coronary heart disease. The most compelling evidence about the benefits of blood pressure lowering is provided by data from trials of drug-based strategies conducted in clinical settings. These studies have demonstrated clear reductions in the risks of stroke, coronary heart disease and heart failure among diverse patient groups treated with a range of different blood pressure-lowering drugs.[5]

Smoking is a powerful risk factor for the development of coronary artery disease; it also leads to more severe and premature atherosclerotic plaques. Cigarette smokers with documented coronary artery disease have an increased 5-year mortality risk, and cessation of smoking lessens the risk of adverse cardiovascular events. Passive smoking may also be important.[6]

Diabetes is an independent risk factor for cardiovascular disease. In the Framingham study the risk of cardiovascular disease for diabetic subjects at baseline was twofold higher in men and three to four fold higher for women after adjustment for other risk factors. More recently, the NHANES study also showed that the diabetic population was twice as likely to develop CAD as the non diabetic population with excess mortality.[7]

METHOD: The study was conducted for a period of 2 years from 2010 to 2012.The study was conducted in the Department of Medicine, Pt. J.N.M. Medical College and Dr. B.R.A.M. Hospital, Raipur. In our study, 103 patients of ischemic heart disease were included. Ischemic heart disease for the purpose of study meant: Myocardial infarction, 51 patients, Stable angina, 32 patients and unstable angina, 20 patients. Patients with ischemic heart disease who were advised coronary angiography by treating physician and fulfilled inclusion/exclusion criteria

were selected for study purpose. Detailed clinical history was recorded including age, sex, presenting complaints, past, personal (including history of smoking, hypertension, and diabetes mellitus) and family history of ischemic heart disease. All patients underwent complete clinical examination to detect the presence of cardiovascular disease including pulse, blood pressure, general examination and systemic examination. All patients gave informed written consent. Blood pressure was measured in the contralateral arm in patients with patient arteriovenous fistulae or grafts. For each subject blood pressure and laboratory variables were reported as the mean of the monthly value. Baseline and annual echocardiography were performed using M-mode and two-dimensional ultrasonography. Left ventricular mass index was calculated according to the Penn convention. Statistical analysis was done by using statistical software SPSS version 16.

INCLUSION CRITERIA:
All the patients who have given informed consent form were included in the study.

EXCLUSION CRITERIA:
Excluded if any of the following conditions were present:
1. Congenital heart disease
2. Hypertrophic obstructive cardiomyopathy
3. Myocarditis, pericarditis
4. Patients with allergy to contrast dye

RESULT:

Table 1: showing age and sex composition in patients of Ischemic Heart Disease:

Age	Sex		No (%)
	Male (%)	Female (%)	
<40	11 (100%)	0	11 (10.68%)
41 - 60	49 (79.03%)	13 (20.97%)	62 (60.19%)
>61	22 (73.33%)	8 (26.67%)	30 (29.13%)
Mean	52.85±11.38	58.14±10.58	53.93±11.13

Eleven patients out of 103, (10.68%), were below 40 years of age. All patients in this group were male.

In 41 - 60 years of age group, there were 62 patients, (60.19%). 13 out of these were females (20.97%) while 49 were males (79.03%).

There were 30 patients (29.13%) above the age of 60 years. 22 patients, (73.33%) were males and 8 patients (26.67%) were females.

Mean age of the present study was 53.93 ± 11.13 years. Mean age for male patients was 52.85 ± 11.38 years and mean age for females was 58.14 ± 10.58 years' value was found to be 0.056, hence this correlation is borderline significant.

Table 2: showing presence of risk factors in Ischemic Heart Disease:

IHD patients	No.	%
No risk factors	8	7.77%
Single risk factor	26	25.24%
Multiple risk factors	69	66.99%

Out of 103 patients of IHD of study, 95, (92.23%) had risk factors present in the form of hypertension, diabetes mellitus, smoking, dyslipidemia or family history. Out of total 103 patients lipid profile could not be done in 11 of the patients due to some technical problems. Eight patients had no known risk factors present, that is in 7.77%. Out of these, lipid profile was not done in one of the patient.

Single risk factor was present in 26 of the patients, i.e. 25.24%. Out of these, lipid profile could not be done in 3 of the patients who had one risk factor present other than dyslipidemia.Sixty-nine patients (66.99%) had multiple risk factors present. Among them, lipid was not done in 7 patients.

P value was calculated to be less than 0.0001; hence presence of Ischemic Heart Disease was significantly associated with presence of multiple risk factors.

Table 3: showing risk factors Vs type of ischemic heart disease.

	No risk factors (n=8)		Single risk factor (n=26)		Multiple risk factors (n=69)		P value
	No.	%	No.	%	No.	%	
MI	3	37.5%	14	53.85%	34	49.27%	<0.0001
UA	4	50%	3	11.54%	13	18.84%	0.0106
SA	1	12.5%	9	34.61%	22	31.88%	<0.0001

Among 8 patients having no known risk factor present, 3 had Myocardial Infarction (37.5%), 4 had Unstable Angina, i.e. 50% and one had stable angina, i.e. 12.5%.

Myocardial Infarction was present in 14 patients having single risk factor, i.e. 53.85%, 3 had Unstable Angina, 11.54%, and 9 had stable angina, i.e. 34.61%.Thirty-four had MI in patients having multiple risk factors, i.e. 49.27%. 13 had unstable angina, 18.84%, and 22 patients had stable angina i.e. 31.88%.

P value was found to be <0.0001 in case of myocardial infarction, 0.0106 in case of unstable angina and < 0.0001 in patients of stable angina. Hence, this correlation between risk factors and ischemic heart disease was found to be statistically significant.

Table no. 4: showing risk factors Vs type of coronary artery disease:

	No risk factors (n=8)		Single risk factor (n=26)		Multiple risk factors (n=69)		P value
	No.	%	No.	%	No.	%	
SVD	1	12.5%	8	30.77%	18	26.08%	0.0003
DVD	1	12.5%	3	11.54%	16	23.19%	< 0.0001
TVD	0	0	4	15.38%	18	26.08%	0.005
Normal coronaries	6	75%	11	42.31%	17	24.64%	0.0688

Among patients having no predisposing risk factors for Ischemic Heart Disease, 1 had single vessel disease; one had double vessel disease, i.e. 12.5% each, while rest 6 had normal coronaries i.e. 75%. No patient had triple vessel disease.

Single vessel disease was found in 8 patients out of 26 having single risk factors. Three had double vessel disease, 11.54% and 4 had triple vessel disease (15.38%). Eleven of the patients had normal coronaries i.e. 42.31%.

Out of 69 patients having multiple risk factors, 18 had single vessel disease (26.08%), 16 had double vessel disease, i.e. 23.19%. triple vessel disease was found in 18 patients while 17 had normal coronaries, i.e. 24.64%.

 In present study, it was seen that presence of coronary artery disease was more likely in presence of multiple risk factors.

 This correlation was found to be significant between single vessel disease, double vessel disease and triple vessel disease. p value for correlation between risk factors and normal coronaries was found to be 0.068 and hence insignificant

Table no.5: showing prevalence of risk factors in Ischemic Heart Disease patients:

	No.	**%**
Hypertension	54	56.84%
Diabetes mellitus	39	41.05%
Smoking	54	56.84%
Family history	31	32.63%
Dyslipidemia	51	53.68%

Hypertension was present in 56.84% of patients having risk factors, Diabetes Mellitus was found in 39 patients i.e. 41.05%. Smoking was present in 54 patients of total 103 patients of study (56.84%). Positive family history was found in 31 patients in the form of Diabetes Mellitus, hypertension & ischemic heart disease in family, i.e. 32.63% while 51 (53.68%) patients had dyslipidemia.

Thus, in this study, hypertension and smoking were present in equal number of patients (54 patients out of 95 who had some risk factors present in them). Both hypertension and smoking were present in highest number of patient of this study. This was followed by dyslipidemia, where 51 patients had abnormal lipid profile present.

DISCUSSION:

Maximum patients in this study (66.99% patients) had multiple risk factors present in them. Among patients having single risk factor (26 patients, 25.24%) most of them had smoking as risk factor present (19 patients), 3 had hypertension, 3 had dyslipidemia and one had family history of IHD present. Eight patients had no risk factors.

According to our study, maximum number of patients had (66.99%) multiple risk factors, which was significantly associated with Ischemic Heart Disease and Coronary artery disease.

This correlates well with new guidelines proposed by NCEP ATP III whereby patients are categorized as high risk when they have multiple major risk factors (especially diabetes), poorly controlled risk factors (especially continued cigarette smoking), the metabolic syndrome (especially [HDL-C] triglycerides ≥ 200 mg/dL plus non–high-density lipoprotein cholesterol ≥ 130 mg/dL with HDL-C <40 mg/dL).

As per study by Khot UN et al, smoking was found in 41.6% of men and 29.5% among women. For diabetes, figure was 23.2% in females and 15.3% in males. Hyperlipidemia was present in 39.6% of females and 34.1% of males; and hypertension was present in 55.9% of women and 38.4% of men. In addition, more than 70% of patients aged 45 years or younger were cigarette smokers.80% to 90% of patients with coronary heart disease had one of the 4 conventional risk

factors namely smoking, diabetes, hyperlipidemia and hypertension. It was found that in younger patients prevalence of risk factors was even higher, smoking among which was most common.[8]

In present study, smoking and hypertension were found to be most common risk factors present in IHD (56.84% each), followed closely by dyslipidemia (53%). In patients of younger age group, < 40 years, 10 of 11 were smokers. Five of these had other risk factors also like diabetic, hypertensive or had significant family history while 5 had no other risk factors. One patient had no known associated risk factor.

In a study by Kumar N et al, hypertension was found to be associated with 45.72% cases, it being the commonest risk factor association followed by diabetes mellitus (40.40%), smoking (16.50%), obesity (16.70%) and family history of IHD (14.54%) in patients of myocardial infarction.[9]

In a study by Germing A et al on patients of CAD (n=821), dyslipidemia was seen in 707 (86.1%), hypertension in 659 (80.3%), smoking in 573 (69.8%) and diabetes mellitus in 228 (27.8%).[10]

Libby P et al reported Sex distribution in our study was found to be predominated by males in the ratio of 3.9:1. This correlates well with the fact that there is excess of coronary artery disease risk in men as compared to premenopausal women. Men have lower HDL levels and higher LDL levels as compared to women due to hormonal factors leading to atherosclerosis which make them more prone for having coronary artery disease. Some of the risk factors are also present more frequently in males like smoking and stress than females. These factors are responsible for higher incidence of ischemic heart disease in males. Libby P et al reported that coronary heart disease incidence rates in men are similar to those in women who are 10 years older than the men.[11]

Shapiro LM reportednot only is smoking a powerful risk factor for the development of coronary artery disease; it also leads to more severe and premature atherosclerotic plaques. Cigarette smokers with documented coronary artery disease have an increased 5-year mortality risk, and cessation of smoking lessens the risk of adverse cardiovascular events. Passive smoking may also be important.[12]

Betteridge DJ reported the major attributable cause of the excess CHD in diabetes is premature and extensive atherosclerosis. Pathological studies have demonstrated that the prevalence of fatty streaks and advanced lesions is increased compared with non-diabetics in populations with widely different CHD rates. Surprisingly little information is available in relation to possible qualitative changes in atherosclerotic plaques in diabetic patients. However, limited data from atherectomy samples and post-mortem studies point to increases in cell-rich and necrotic areas and necrotic lipid cores, calcification and healed plaque ruptures.[13]

Ridker PM et al reported both mental stress and depression predispose to increased vascular risk. The adrenergic stimulation of mental stress can augment myocardial oxygen requirements and aggravate myocardial ischemia. Mental stress can cause coronary vasoconstriction, particularly in atherosclerotic coronary arteries, and hence can influence myocardial oxygen supply as well.

Studies have further linked mental stress to platelet and endothelial dysfunction, the metabolic syndrome and the induction of ventricular arrhythmia.[14]

CONCLUSION: Ischemic heart disease is the major contributing cause of death in the western world and the incidence is increasing indeveloping countries. Most of the patients with coronary artery disease, severe enough to warrant coronary artery bypass grafting; have at least one of the major modifiable risk factors for IHD. Modification of these factors may well reduce the disease burden of CAD and reduce the cardiovascular mortality. So prevention, modification and improvement of these risk factors especially hypertension in middle age group can decrease numbers and severity of IHD.

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