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A DESCRIPTIVE STUDY OF THE CONVENTIONAL AND NEW RISK FACTOR ANALYSIS IN PATIENTS WITH ISCHAEMIC HEART DISEASE

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ABSTRACT: BACKGROUND: Cardiovascular disease remains the leading cause of morbidity and mortality globally. In Indian sub continent more than 25% of deaths due to Cardio Vascular Disease. High blood pressure, high LDL cholesterol, smoking, Diabetes, Overweight, poor diet, physical inactivity, excessive alcohol use are known major cardiovascular risk factors. The identification of modifiable risk factors helps in risk reduction through primary interventions. Several markers have been studied and proposed as predictors of CV events. **OBJECTIVES:** To study the conventional risk factors and also lipoprotein (a) as predictor of ischemic heart disease. **MATERIALS AND METHODS:** The present study was conducted in the department of cardiology, and medicine of K.L.E 's Hospital and MRC, Belgaum for a period of one year. Total sample size as determined by the systematic sampling method was 74. Detailed history was taken. Risk factors like smoking, alcohol, family history of CVD, type A personality, obesity , hypertension, diabetes mellitus assessed. Total cholesterol, HDL , LDL, Triglycerides and lipoprotein (a) levels measured. Cardiovascular events identified and managed accordingly. **RESULTS :** Smoking was commonest risk factor present in 51.3% of patients. Hypertension was the second most common risk factor seen in 47.2%. Majority of our patient had multiple risk factors. 81% of patients had high LDL more than 130mg/dl. 31.0% had triglyceride level of more than 165mg.dl. 16.2% had low HDL below 30mg/dl. Serum lipoprotein(a) was elevated in 32.4% patients. 64.8% of them had complications during hospital stay. Mortality rate was 9.4% in our study. **CONCLUSIONS:** Smoking, hypertension, diabetes, hyperlipedemia and obesity were major risk factors for ischaemic heart disease. Lipoprotein (a) was not found to be an independent risk factor. By targeting at modifiable risk factors through primary and secondary intervention the burden of cardiovascular disease can be minimised.
KEY WORDS: conventional risk factors, coronary heart disease, hypertension

INTRODUCTION: Cardiovascular disease remains the leading cause of morbidity and mortality globally. WHO estimates around 17.3 million people died from CVD in 2008. Over 80% CVD deaths took place in lower and middle income countries. It is estimated that by 2030 more than 23 million people will die annually from CVD.[1] For American Indians and Asians heart disease is second only to cancer.[2] In Indian sub continent more than 25% of deaths due to CVD. Prevalence of CVD found to be more in urban than rural areas. Increase is seen both in urban as well as rural areas. [3,4] By 2000 CVD had led to 1.59 million deaths and stroke to 0.6 million deaths.[3]High blood pressure, high LDL cholesterol, smoking, diabetes, overweight, poor diet, physical inactivity, excessive alcohol use are known major cardiovascular risk factors.[5-9]

CV events occur even in subjects without the established risk factors.[10] The identification of modifiable risk factors helps in risk reduction through primary interventions.[11] Several markers

have been studied and proposed as predictors of CV events. Here apart from conventional risk factor we have studied role of lipoprotein (a) as predictor of ischemic heart disease.

AIMS AND OBJECTIVES:
1. To assess the conventional risk factors in myocardial infarction.
2. To assess newer risk factor in myocardial infarction

MATERIALS AND METHODS: The present study was conducted in the Department of Cardiology and medicine of K.L.E's Hospital and MRC, Belgaum for a period of one year.

Selection of cases: Inpatients who met the following criteria were included in the study
1. Patients with history suggestive of acute myocardial infarction.
2. ECG evidence of acute myocardial infarction
3. Elevated levels of cardiac enzymes(CKMB, LDH, AST)

Total sample size as determined by the systematic sampling method was 74.

The 74 patients who met the above said inclusion criteria were evaluated in detail regarding,
1. Symptoms and signs
2. Risk factors like smoking, alcohol, family history of CVD, type A personality, obesity, hypertension, diabetes mellitus, lipid profile, lipoprotein (a),
3. Type of infarction
4. Course of hospital stay and complications
5. Mortality

Definitions in our study included,

Smoking: Patient who smoked more than 25 cigarettes per day was taken as smoker

Hypertension: Was defined as persistent recording of blood pressure more than 140/90mmhg according to Framingham heart study.

Diabetes Mellitus: Patients with FBS>126mg/dl, PPBS>200mg/dl. Patient at the time of diagnosis of DM or who require insulin therapy or oral drugs for the control of diabetes were said to be diabetics.

Obesity: Was considered the risk factor if the BMI exceeded 30mg/m2. BMI was calculated by the formula,   weight (kg)

Height (m) ^{2}

Type A personality: Patient with severe ambition, competitiveness, sense of urgency and hostility were significant predictor of MI. And personality was determined by Bortner scoring method.

Serum lipoprotein (a): was estimated by Latex enhanced turbidometric test for the quantitative determination of lipoprotein (a). It was considered to be raised if the value was above 30mg/dl. A detailed history, physical examination, assessment of risk factors, serial ECG, cardiac enzyme level recorded on a standard proforma. Routine investigations were done as complete blood picture (CBC) with ESR, blood sugar and electrolytes; urine for routine examination, chest X-ray was taken in all the cases. After thorough investigations the results were tabulated.

OBSERVATIONS: Maximum incidence of myocardial infarction was seen in age group of 41-50 years (36.4%). The age group of 51-60 accounted for 22.9%.

75% of patients were males. Male to female ratio was 2.9:1

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The commonest presentation was typical history of chest pain with radiation and associated with sweating. 31% of our patients had anterior wall myocardial infarction and 29.7% had inferior wall myocardial infarction. Combination of infero lateral infarction was seen in 12.1% of patients. Smoking was commonest risk factor present in 51.3% of patients. Hypertension was the second most common risk factor seen in 47.2%. Majority of our patient had multiple risk factors.

81% of patients had high LDL more than 130mg/dl. 31.0% had hyper triglyceridemia of more than 165mg.dl. 16.2% had low HDL below 30mg/dl.

Serum lipoprotein (a) was elevated in 32.4% patients.

All our patients had elevated cardiac enzymes.

47.2% had ST segment elevation with T wave inversion. Q wave myocardial infarction was present in 28.3% of our patients.

85.1% of patients recovered from the cardiovascular event. 64.8% of them had complications during hospital stay. The most common was arrhythmias seen in 36.4% of patients. Ventricular tachycardia was commonest arrhythmia seen. Others included cardiogenic shock (17.5%), LVF (9.4%), complete heart block (5.4%), papillary muscle dysfunction (1.3%) and post infarction pericarditis (1.3%).

Duration of hospital stay was 14 days. Mortality rate was 9.4% in our study.

DISCUSSION: It is well known that myocardial infarction is commonly seen after 40 years of age. Age is one of the non modifiable risk factor for CHD.[12] In males the rise usually seen around 45-50 years. But for women, increase sharply continues until the age of 60-65 years. An increase in risk factor level was associated with age related increase in CHD incidence and mortality in both sexes but to a larger extent in women.[13]

CHD is 2-5 times more common in men than women. The mortality was 5 fold greater in women .The incidence of prevalence of cardiovascular risk factors is greater among women. Diabetes and triglycerides represent major risk factor in women. Menopause is considered to be cardiovascular risk factor.[14]

Studies have shown that family history of myocardial infarction is a risk factor for coronary heart disease.[15,16] The maternal and paternal history of myocardial infarction and risk for CVD was studied by Physicians Health Study and Women's Health Study. Premature paternal history of MI was an important and independent predictor of CVD in both men and women. Maternal history of MI appears to predict CVD s paternal history and even at older ages of maternal MI.[17] In our study we had positive family history in 32.4% of patients.

Smoking is an important modifiable atherogenic risk factor. A clear dose response relationship exists between number of cigarettes smoked and increase of risk of CHD. Smoking cessation can considerably reduce the risk of CHD in both genders. [12,14,18] Passive smoking also must be considered as a risk factor for CVD.[18] 51% of our patients had history of smoking and majority were males.

Hypertension is a powerful contributor to all major CVD's. It is atherogenic risk factor in both genders.[11] JNC7 reclassified hypertension. in those older than age 50, systolic blood pressure (SBP) of >140 mmHg is a more important cardiovascular disease (CVD) risk factor than diastolic BP (DBP); beginning at 115/75 mmHg, CVD risk doubles for each increment of 20/10 mmHg; those who are normotensive at 55 years of age will have a 90 percent lifetime risk of developing

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hypertension; pre-hypertensive individuals (SBP 120–139 mmHg or DBP 80–89 mmHg) require health promoting lifestyle modifications to prevent the progressive rise in blood pressure and CVD.[19] The prevalence of hypertension is rare among young females but considerably increases after menopause. Anti hypertensive treatment reduces the incidence of stroke and non fatal myocardial infarction [14,18] in our study 47% of patients had hypertension and it was found in association with other factors.

According to WHO the global prevalence of diabetes was estimated to be 10% in 2008. CVD accounts for 60% of all the mortality in people with diabetes.[20]

Kannel examined prospectively, in the Framingham cohort, the relation between the diabetes and impaired glucose tolerance with CVD. It was found that the incidence of CVD and risk factors were more in diabetic than in non diabetic men and women. Diabetes affects the large and small vessels. The microvascular disease is responsible for nephropathy, retinopathy, and neuropathy. It has unique effect on heart muscle. Impact of diabetes on cardiovascular mortality and cardiac failure were more in women. Diabetes is a risk factor for several forms of CVD's. [21] Women with diabetes seem to lose most of this inherent protection against developing CVD.[11,22]

A study showed that markers of impaired insulin secretion and insulin resistance were independently associated with an increased risk of heart failure. There is some evidence of a direct atherogenic action of the proinsulin molecule, through coronary microcirculatory changes leading to ischemic injury [6] The inverse association between moderate alcohol consumption and CHD is well established. A meta-analysis showed that consumption of 30g of alcohol a day would cause an estimated reduction of 24.7% in risk of CHD. It was known to increase HDL, apolipoprotein-A1 and triglycerides.[23] Alcohol is also associated with lower plasma fibrinogen concentrations and reduced platelet activity thereby lowers the probability of thrombosis.[24] At heavier levels of drinking risk of all CVD actually tends to increase, producing a U shaped relationship.[25]

Data from Framingham study have established an increased incidence of cardiovascular events with increasing weight in both men and women.[26] In a meta-analysis done by Ting Fei Ho, one of the most important cardiovascular diseases associated with obesity is Hypertension. Increase in body mass index is often an independent risk factor for the development of elevated blood pressure, clustering of various cardiovascular risk factors in metabolic syndrome, abnormal vascular wall thickness, endothelial dysfunction and left ventricular hypertrophy. Both systolic and diastolic blood pressures were positively correlated with BMI. Increasing proportions of children with elevated BP were found among those with normal weight (7.5%), overweight (16.9%) and obese (25.2%).[27] Population studies have shown that more than 75% of hypertension can be directly attributed to obesity.[28] In our study 37% of patients were found to be obese. Most of them were females and had sedentary lifestyle.

Friedman in 1958, first ever detected the extraordinary association of Type A behaviour pattern with increased prevalence of clinical coronary heart disease.[29] Review by Lachar BL suggested that it is coronary prone behaviour and not type behaviour which is related to CHD. The behaviour characteristics which include physiologic and emotional reactivity to challenging situations like anger, mistrust, suppressed or expressed hostility may be considered potent psychosocial risk factors for CHD. However further research demanded on the same.[30] In a review by Stangl, depression found to be associated with CHD in men and even more at pronounced degree among women.[18] In our study type A personality seen in around 37% of patients and more seen in

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males. Association of dyslipidemia with CHD is shown in many studies. The significance of total cholesterol was found to be less than HDL-C in men. Low HDL-C and high triglycerides found to be independent risk factor for CHD in both genders particularly in females. High HDL-C associated with greater protection.[13,14,18] In multivariate analysis of the type used by Framingham investigators, low HDL cholesterol levels are more consistent and reliable predictor of increased CHD rates rather than triglyceride concentration.[31]

Study by Goel et al, on North Indian population showed high triglycerides and low HDL levels to be universal phenomenon in patients with CHD.[32] In our study high triglycerides were seen in 31% of patients.

In a large prospective study, lip (a) found to be independent risk factor and levels remain constant over time and weakly correlated with other risk factors.[33,34] Elevated levels of lip(a) identifies patient who is more likely to be benefited by lipid lowering drugs, [35] and found to be superior in risk prediction than conventional lipid fractions.[36] Lip(a) was elevated in 35.1% of our patients and was predominantly seen around the age group of 40 years. It was associated with other risk factors. Only three of our patients had less than two risk factors. Clustering of risk factors was seen in many of our patients. Our study revealed high prevalence of smoking (51.3%), hypertension (47.2%), diabetes mellitus (45.9%), hyperlipidemia particularly triglycerides (45.5%), obesity (41.8%), type A personality(35.1%) cases.

Although the traditional risk factor concept has been well established, it does not fully account for the risk of cardiovascular disease. Inflammation plays an important role in athero-thrombogenesis and its clinical complications.[37] CORODONT study found an association between periodontitis and presence of CHD. Periodontal pathogen burden, and particularly infection with A actinomycetemcomitans was found to be of special importance.[38]

Elevated total plasma homocysteine (tHcy) in humans is associated with cardiovascular disease and consistent evidence that dietary and supplemental folic acid can reduce homocysteine levels.[39] Meta analysis showed that cystatin C is strongly and independently associated with subsequent CVD risk.[40] Also associated with wide spectrum of CVD, like peripheral arterial disease, stroke, abdominal aortic aneurysm, heart failure, coronary artery disease and their adverse outcome.[41]

Given the multifactorial nature of CVD, no single solution will be applicable to all geographic and economic regions of the world. However risk factor reduction done by implementing public health measures, targeting high risk subgroup of population that will benefit most from cost effective preventive measures ,[42] lifestyle modifications like increasing intake of dietary fibers. In a large multi-centre, randomized 5-year clinical trial the PREDIMED study, increasing dietary fibre intake with natural foods was associated with reductions in classical and novel cardiovascular risk factors in a high risk cohort. [43] Lairon D in his study concluded that dietary fiber intake is inversely correlated with several cardiovascular disease risk factors in both sexes, and recommends increased intake of dietary fibers.[44] and finally by giving higher cost treatments.[42]

In conclusion, our study has highlighted the already known risk factors for CVD and the newer risk factor. By targeting modifiable risk factors like smoking, hypertension, diabetes, dyslipidemias, and obesity either through primary or secondary prevention the overall morbidity and mortality due to CVD can be reduced.

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Table 1: Risk factors in patients

Risk factor	Male	Female	Total	Percentage(%)
Smoking	38	0	38	51.3
Hypertension	32	0	35	47.2
Diabetes Mellitus	24	03	34	45.9
Hyperlipidemia	27	10	31	41.8
Obesity	19	04	28	37.8
Type A	16	09	26	35.1
S. Lipoprotein (a)	17	10	24	32.4
Combination			71	95.9

Table 2: Lipid profile abnormalities

Lipid profile	Normal (%)	High (%)
Total cholesterol	58.1	41.8
HDL	83.7	
LDL	18.9	81.0
Triglycerides	68.9	31.0

Abbreviations: CVD cardio vascular disease, LDL low density lipoprotein, HDL high density lipoprotein,DM diabetes mellitus, BMI Body Mass Index,MI myocardial infarction,CHD coronary heart disease, Lip(a) lipoprotein (a)

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