

# Risk Factors In Coronary Artery Disease: A Pilot Study

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## INTRODUCTION

Ischemic heart disease is the most important indicator of coronary arteriosclerosis available today. Practically all patients with myocardial infarction and unstable angina have some evidence of coronary artery arteriosclerosis[1].

An epidemiological perspective has shown that hypercholesterolemia, hypertension and cigarette smoking may be the most potent risk factors in Great Britain[2] and America[1]. Many investigators[3,4,5] think that the prevalence and influence of risk factors in Asian countries may be different from those in Western countries.

In this context a small pilot study was conducted in Shaikh Zayed Hospital, Lahore, to substantiate such views.

## MATERIALS AND METHODS

The study included all patients admitted to the C.C.U/ward of the cardiology department with the diagnosis of acute myocardial infarction or unstable angina.

Those patients who fulfilled two out of the three criteria shown in Table-1 were categorized as having myocardial infarction, whereas for unstable angina, typical history was the sole criteria. A detailed proforma was filled for each patient which included a complete medical/personal/social and family history. Physical examination comprised measurement of blood pressure, height, weight, abdominal and hip girth. Ratio of abdominal: hip girth > 1[6] and 20% excess over ideal weight[1] were taken as health risks for coronary artery arteriosclerosis.

Laboratory investigations were carried out in our hospital laboratory, using standard techniques. Standard values were taken as normal[1] Venous blood was taken after overnight fasting, 7 days post myocardial infarction, for hemoglobin, blood glucose, lipid profile and uric acid analysis.

Known risk factors reviewed were hyperlipidemia, hypertension, smoking, obesity, diabetes mellitus, hyperuricemia, physical inactivity, emotional stress, and family history of ischemic heart disease.

## RESULTS

Total patients were 83, out of these 63 were male (76%) and 20 were females (24%). Table-2 shows the distribution, mean age being 56 years  $\pm$  11. Maximum patients (61) i.e 73% were between the ages of 40-60 years. Environment and social evaluation is shown in Table-3. 76 (92%) patients hailed from urban areas, 68 (82%) were educated up to primary (class-5), 53 (64%) belonged to the middle or lower class having an yearly income of Rs.50,000.00 or less, but financial dependents of 5 or more were present in 36 (43%) patients. (An interesting point regarding marital status was that only one patient was single, posing the question is marriage a risk factor?). Only 11 patients (13%) did regular moderate exercise (defined as exercise at least 5 times/week, 15 minutes each time, making the patient sweat.) 45 (54%) patients were smokers; all males. 22(26%) patients gave history of 20 pack years or more of smoking. The quality and brands of cigarettes consumed was variable but all were filter tipped. Dietary history of a high fat consumption of more than 100 gms/day was given by all, with (40%) giving history of >800 mgs of cholesterol intake per day. History of hypertension was present in 31 (37%) patients but in almost all of them blood pressure was normal at the time of study. 22 (27%) patients had diabetes mellitus. Family history of ischemic heart disease was present in 20 (24%) patients and of diabetes mellitus or hypertension in 17 (21%).

Table 1

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Typical chest pain

Significant  $\bullet$  Wave (>0.04 secs or > 25% of the R wave in at least 2 contiguous leads).

Typical enzyme changes.

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**Table-2 Age Distribution**

Age	No. of Cases	Percent
30-40	6	7.2
41-50	23	28.0
51-60	31	37.0
61-70	16	19.2
71-80	6	7.2
81-90	1	1.2

Mean Age:- 50 years.

Maximal, 61 (73%), patients were between the ages of 40-60 years.

**Table-3 Evaluating Environment**

	No.	Percent
<b>Family composition</b>		
Single.	1	1.2
Married	71	85.5
Widowed.	10	12.0
Divorced.	01	1.2
Children/Dependent >5	36	43.0
Joint family system.	28	34.0%
<b>Education</b>		
Primary	15	-
More than primary	68	-
<b>Living District</b>		
Rural	7	8
Urban	76	92
<b>Yearly Income</b>		
<50,000	53	64
<30,000	33	40
>30,000 <50,000	20	24
>50,000	30	36
<b>Occupation</b>		
Among 20 House wives	19	95.0
Females Employed	01	5.0
Males(63)		
Private/Govt.employees	28	44.4
Self-employed.	23	36.5
Retired.	12	19.0
Life style very stressful	30	36.0

Physical examination showed ratio of abdominal ; hip girth greater than 1 in 32 (39%) patients and 20% excess over ideal weight in 18 (22%) patients. Abnormalities in bio-chemical laboratory estimation (Table-4) showed low HDL in 77 (91%) patients. A total cholesterol: HDL ratio greater than 5 was seen in 54(65%) patients. However, an absolute increase in the cholesterol level of above 220 mg% was seen in a small percentage i.e. 24% (20 patients). Mean cholesterol: 187±43 mg%, Mean HDL: 33±9 mg%, Mean Hb: 13.4±2 g%. A raised serum uric acid was seen in 30 (35%) patients.

**Table-4**

	Percent
<b>A Physical Activity</b>	
72 patients sedentary	87
11 patients did regular moderate exercise. (Out of these nine male & two female.) Only eight did exercise at leisure.	13
<b>B Smoking</b>	
Smokers 45 i.e. [22 patients i.e. 26.5% gave history of 20 pack years.]	54.2
<b>C Alcohol</b>	
6 Patients	7.2
<b>Diet</b>	
Fat > 100 gm per day	83 patients 100
Cholesterol > 800 gm per day	33 patients 40
<800 mg per day	50 patients 60

9(11%) patients, out of whom 8 were male did not have any known major risk factor.

## DISCUSSION

Elevation of serum cholesterol and hypertension as major risk factors do not seem as important in our patients as reported in various studies from the Western countries [2,3]. Inadequate physical activities, smoking, low HDL and cholesterol: HDL ratio greater than 5, seem more important for our group of patients.

Blood levels of HDL were first negatively correlated with the risk of coronary disease in the early 1950's[7]. Since then, a large number of cross-sectional and case controlled studies have confirmed this relation

and its independence from other blood lipids and lipoprotein measures as well as from other risk factors[7]. More recent studies by Jacobs and the Framingham data continue to confirm this basic association[7]. Multivariate statistical analysis indicates that the protective HDL cholesterol influence on coronary heart disease is about twice as strong as the atherogenic LDL cholesterol effect. For every 10 mg% change in HDL cholesterol, there is a corresponding 50% change in coronary heart disease risk. At both high and low cholesterol values, the total cholesterol: HDL ratio efficiently indemnifies persons at high risk. Optimal ratios are around 3.5, ratios above 5 are dangerous[7].

Table-5

	No.	Percent
Hypertension	31	37
On regular treatment	17	-
Irregular treatment	9	-
No treatment	5	-
Diabetes Mellitus	22	27
Regular treatment	15	-
Irregular treatment	7	-
Hypertension and Diabetes Mellitus both.	11	13

Table-6

Physical Examination		
Ratio of abdominal girth:hip girth > 1 Six female and 26 male	32	39
20% excess over ideal weight Out of these 9 female and 9 male.	18	22

Table-7

	No.	Percent
Total cholesterol > 220 mg%	20	24
High total triglycerides	18	21
High total lipids	1	2
High LDL cholesterol	1	2
Low HDL cholesterol	77	91
Raised Uric Acid > 7.0 mg%	30	35
Total cholesterol HDL > 5	54	65

Exercise is important for the prevention/ regression of atherosclerosis, as well as modification of serum cholesterol and HDL level. Inadequate physical activity was significant in our group of patients. The preventive value of exercise for atherosclerosis was first suggested by longitudinal animal experiments [8]. When cockerols were fed a high fat diet, exercise corrected elevations of the serum cholesterol [8]. One study of rabbits suggested that regular physical activity decreased the severity and extent of experimental atherosclerosis without decreasing the serum cholesterol level [8]. There is a dearth of long term preventive trials in man. A 16-week exercise regimen [9] showed favourable changes in coronary risk factors including decrease of serum cholesterol and triglycerides and an increase in the HDL:LDL cholesterol ratio. The effect of individual training on plasma lipoproteins was investigated in 27 healthy sedentary men over a period of 4 months (3 hrs/week). A significant increase in the HDL concentration was observed. Significant reduction of plasma triglycerides, VLDL and LDL concentration were observed only when training led to a pronounced improvement in physical working capacity [10].

Another common finding was cigarette smoking in this group of patients, although the percentage of smokers not suffering from CAD needs to be looked into. All epidemiological data are consistent with the fact that smoking is an important risk factor for CAD [11,12,13,14]. Both Framingham [15] and Gotenburg[16] studies, conducted on 2 different populations, have confirmed this emphasizing that no level of smoking is safe with regard to CHD risk. It seems appropriate to mention here a study from Japan by Goto et al [17] whose results partly parallel ours, showing that serum cholesterol > 220 mg% was in 38% of their group of ischemic heart disease patients and 70% of normocholesterolemic patients had HDL cholesterol < 40 mg%. Smoking was the most important risk factor, present in more than 70% of normocholesterolemic patients.

## CONCLUSION

In our study, 31(37%) patients had history of hypertension, while only 20(24%) patients had serum cholesterol > 220 mg%. These two major risk factors of the West, therefore, do not seem as important in our patients. Instead, inadequate physical activities, smoking, low HDL and a total cholesterol: HDL ratio > 5 or more, seem to have the greatest

implications in our group of patients.

We realize that this study has a very small sample and is not control matched. These findings need to be substantiated by a more comprehensive, nation-wide study. We hope that such a co-operative study would sort out the factors leading to the incidence of this disease in our population.

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