Original Article

Frequency of Coronary Heart Disease: Risk Factors among Doctors of CMH Lahore Medical and Dental College, Lahore – Pakistan

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Abstract

Objective: To determine the frequency of various risk factors for Coronary Heart Disease (CHD) among doctors of CMH Lahore Medical & Dental College, Lahore, Pakistan. **Design**: A cross-sectional study. **Place and Duration of Study**: The study was conducted at CMH Lahore Medical & Dental College, Lahore from 01 Jun 2011 to 31st Jul 2011. **Subjects & Methods**: A sample size of 104 subjects was selected by convenience sampling after taking verbal consent. A pre-tested questionnaire consisting of questions about presence or absence of CHD risk factors was self-administered. Variables such as gender, age group, and CHD risk factors such as hypertension, diabetes mellitus, family history of heart disease, smoking, hypercholesterolemia, Body Mass Index (BMI) and exercise were included. **Results**: Among 104 subjects, 53(51%) were males, 51(49%) females and less than 40 years age group were 53 (51%) and more than 40 years were 51(49%). Proportions of

major risk factors were: hypertension 20.2%, diabetes mellitus 7.7%, smoking 13.5%, hypercholesterolemia 19.2%, overweight 33.7%, obesity 5.8%, and lack of regular exercise 40.4%. Proportions of three major risk factors (smoking, hypertension and hypercholesterolemia) occurring singly, doubly and all three together in the study population were found to be 16.3%, 9.7% and 4.8% , respectively. Data was also analyzed for risk factors by comparing those with and without family history of CHD to eliminate any bias. Results were not statistically significant except for hypertension (P = 0.002). **Conclusion**: There is a high prevalence of CHD risk factors in doctors of CMH Lahore Medical & Dental College. Modifiable risk factors like diabetes, hypertension and cholesterol need better control. Preventive screening programs and healthy lifestyles need to be emphasized. **Key Words**: CHD (Coronary heart disease), risk factors, frequency, doctors.

INTRODUCTION

Cardiovascular disease (CVD) causes 17.1 million deaths (29 per cent of all deaths) globally each year, making it the world's number one killer. Eighty-two per cent of these deaths occur in low- and middle-income countries.[1] This excessive number of deaths is particularly saddening, since through steps such as eating a healthy diet, regular physical activity and avoiding tobacco, the majority of these deaths could be prevented. Pakistani population has one of the highest risks of coronary heart diseases (CHD) in the world. In Pakistan, 30 to 40 percent of all deaths are due to cardiovascular diseases (CVD) as the CHD claims nearly 200,000 lives in Pakistan every year.[2] Coronary Heart Disease (CHD) also called Coronary Artery Disease (CAD), ischaemic heart disease (IHD), and

atherosclerotic heart disease, is the end result of the accumulation of atheromatous plaques within the walls of the arteries that supply the myocardium. IHD is a syndrome, which remains a major cause of deaths worldwide. There is a high prevalence of CVD risk factors in Pakistan with more than 30% population over 45 years of age affected by disease.

The steady increase of mortality due to coronary disease in the 1940's and 1950's was followed by a declining trend in the United States, Australia and several European countries since late 1960's. This was attributed to the increased awareness among population about the modification of risk factors. However, during this period, a disturbing shift of coronary mortality towards younger age group and a

diminishing male/female ratio was observed.[3] International study (an international case-control study examining risk factors for initial myocardial infarction (MI) in 52 countries, including 12,000 cases of initial MI and 14,000 controls) demonstrated that over 90% of the global MI risk can be attributed to 9 modifiable risk factors (smoking, diabetes mellitus, lipids, central obesity, hypertension, diet, physical activity, alcohol consumption, and psychosocial factors).[4] Tobacco use has been documented in 36% adults males and 9% adults females.[5] The knowledge of these risk factors may help guide policymaking for its effective control in the urban community. The objective of this study was to estimate the proportions of CHD risk factors among doctors of the medical and dental college.

SUBJECTS AND METHODS
A cross-sectional study was conducted at CMH Lahore Medical & Dental College from 01 June 2011 to 31st July 2011. Convenient sampling methodology was used and 104 subjects were included after taking verbal consent from them. A pre-tested questionnaire consisting of questions regarding presence/absence of CHD risk factors was self-administered. CHD risk factors included in this study have been listed. Body Mass Index (BMI) of each individual was calculated by the formula BMI = Weight in Kg/Height in m^2. It was then rated as underweight (BMI<18.5), normal weight (BMI 18.5 to 24.9), overweight (BMI 25-29.9) and obese (BMI $\geq$ 30). Hypercholesterolemia was defined as serum cholesterol greater than 200mg/dl.

Analysis
Data was entered and analyzed by using Statistical Package of Social Sciences (SPSS version 16.0) program. Demographic data and frequency of risk factors were reported by percentages. Tables and graphs were used to present the data. Chi-square test of significance was used to see significance of difference by comparing proportions of risk factors in two groups with and without family history of heart disease. P-value <0.05 was considered significant.

Definition of CHD risk factors
- **Family History**: Defined as death of first-degree male relative (grandfather, father or brother) before the age of 55 years or first –degree female relative

(grandmother, mother or sister) before the age of 65 years.
- **Hypertension**: According to JNCVI, defined as systolic blood pressure (SBP) of 140 mmHg or greater, diastolic blood pressure (DBP) of 90mmHg or more or taking anti-hypertensive medication.
- **Diabetes mellitus**: Any patient with two fasting blood glucose levels of 126mg per dl (7.0 mmol per L) or greater is considered to have diabetes mellitus. It also includes patients who are on oral hypoglycemic drugs or taking insulin.[6]

Table-1
Proportion of risk factors for CHD in study population

Risk factors	Frequency	Percent
Hypertension		
Present	21	20.2
Absent	83	79.8
Diabetes mellitus		
Present	8	7.7
Absent	96	92.3
Family history of heart disease		
Present	53	51
Absent	51	49
Smoking status		
Smoker	14	13.5
Non-smoker	90	86.5
Serum cholesterol (mg/dl)		
>200	20	19.2
<200	84	80.8
BMI		
18.5-24.9 (Normal weight)	55	52.9
25-29.9 (Overweight)	35	33.7
≥30 (Obese)	6	5.8
Regular exercise		
yes	42	40.4
No	62	59.6

- **Cigarette Smoking**: Current regular smoker is defined as a person who smokes one or more cigarettes per day, everyday.
- **Hypercholesterolemia:** Total serum cholesterol >200mg/dl.
- **Obesity:** Body mass index (BMI) (BMI = weight (Kg)/Height (in squared meters) greater than or equal to 30 for men and women. The term normal weight is defined as BMI 18.5 to 24.9.

Table- 2
Proportions of risk factors in two groups with and without family history of heart disease

Family history of heart disease			
Risk factors	Positive (n=53) Frequency (%0	Negative (n=51) Frequency (%)	P- value *
Hypertension	17	4	0.002
Diabetes mellitus	5	3	0.49
Smoking	9	5	0.28
Hypercholesterolemia	12	8	0.39
Sedentary lifestyle	32	30	0.86

*P-value compares proportions in positive and
 negative groups using chi-square test.

RESULTS
Demographic Variables: Subjects less than 40 years were 53 (51%) and more than 40 years were 51 (49%). Out of 104 subjects, 53 (51%) were males and 51 (49%) were females.

CHD risk factors: The CHD risk factors proportions are shown in Table-1. Twenty-one (20.2%) study subjects (12 males and 9 females) were known hypertensive. When hypertension was matched with gender, the results were statistically insignificant (p = 0.34). Family history of heart disease was present in 53 (51%) of study subjects. Fourteen (13.5%) of study subjects were smokers. About 19% of study population was suffering from hypercholesterolemia. Fifty-five (52.9%) of study subjects were having normal weight, 35 (33.7%) were overweight and 6 (5.8%) were obese. Regular exercise was a routine for 42 (40.4%) of study group.
Multiple Risk Factors: We also looked at the number of risk factors in totality of study group. Selecting the

three major risk factors for CHD, which include cigarette smoking, hypercholesterolemia and hypertension, we grouped them into categories one, two and three risk factors. It is noteworthy that 72 (69.2%) participants of study were free from any one the above-mentioned risk factors.

In order to eliminate the bias of the positive of CHD in the study population, the data were analyzed for proportions of CHD risk factors in two groups – one with family history of heart disease and other one with no family history of heart disease. Table 2 shows the proportions of risk factors for CHD in groups of study population with and without family history of heart disease. Proportion of hypertension in those with family history of heart disease +ve group was much higher compared those with no family history of this disease (81% vs 19%) and these proportions were significantly different (p = 0.002). However, no significant differences were observed when population of diabetes mellitus, smoking, hypercholesterolemia and sedentary lifestyle were compared by test of associations using Chi-square test.

Gender and BMI were also compared. Although there were more obese in females as compared to males (4 vs 2) but this difference was not statistically significant (p = 0.22).

When CHD risk factors were compared among two age groups, it was found that hypercholesterolemia and BMI were significantly associated with age groups (p = 0.03 and 0.003 respectively). There were more overweight (21 vs 10) and more obese (4 vs 2) in age group 40 years and above as compared to age group less than or equal to 40. Similarly hypercholesterolemia was also more frequent in over 40 years age group as compared to ≤40 years age group (13 vs 7).

DISCUSSION
The epidemiological data reveal a marked difference in morbidity and mortality due to CHD in various parts of the world. This is largely due to variable frequency of different risk factors of CHD in various countries. Due to recognition and control of some risk factors like hypertension, diabetes, hyperlipidemia, and especially cigarette smoking, the incidence of CHD has shown a downward trend in some Western countries and USA. Unfortunately, there seems to be opposite tendency in the Asian and African countries where frequency of CHD is rising.

The sex distribution of our study population is comparable to the overall population of Pakistan[7] because there are slightly more males (51%) than females (49%). Age of our study population was divided into two groups and there were 53 (51%) <40 years and 51 (49%) more than 40 years age. Normally CHD risk factors show increased incidence above 40 years of age as was also seen in our study. In our study, when CHD risk factors were compared among two age groups, it was found that hypercholesterolemia and BMI were significantly associated with age groups (p = 0.03 and 0.003 respectively). There were more overweight (21 vs 10) and more obese (4 vs 2) in age group 40 years and above as compared to age group less than or equal to 40. Similarly hypercholesterolemia was also more frequent in 40 years & above age group as compared to ≤40 years age group (13 vs 7).

Hypertension is an independent risk factor for cardiovascular disease and can increase the risk by 2-3 fold. Hypertension was present in 20.2% study subjects. Although there were more hypertensive males (12) than females (8) but this difference was not statistically significant (p=0.34).

Diabetes is an established risk factor for CHD and stroke and CHD is more common in diabetics.[8] In the present study, diabetes mellitus was present in 7.7% of subjects. Other studies have shown wide range (13 to 36%) cases of diabetes mellitus.[9]

The familial predisposition forms an important risk factor as some families have increased frequency of heart attack at younger age groups. This may be due to the fact that some risk factors like hypertension, diabetes and hyperlipidemia run in families. The present study revealed a high frequency (51%) of family history of heart disease. The familial predisposition thus seems to contribute significantly to the burden of CHD in our setting. Moreover, hypertension as risk factor of CHD was high (17%) in those subjects with positive family history of heart disease as compared to those without family history of heart disease and this difference was statistically significant (p = 0.002)

There is a clear cut association between cigarette smoking and susceptibility to CHD. Regular cigarette smoking was seen in 13.5% of this group. This might be due high awareness among doctors of hazards of smoking. The association between elevated blood cholesterol and heart disease has long been known. Results from long-term population studies such as the Framingham study have validated the association.[10] About 19% per cent had high cholesterol (>220mg/dl) in our study. However, even those with acceptable cholesterol concentrations have shown to develop CHD, suggesting that this acceptable cut-off concentration for total cholesterol may actually be too high for Pakistani population.

It is desirable to maintain a healthy BMI in the range of 18.5 to 24.9 for both men and women. A BMI of 30 and above was found in 5.8% of study subjects, which is much lower than reported by Iqbal S.P. & et al[11], which was 24%. However, percentage of overweight people in our study was much higher i.e. 33.7%. Data from long-term Framingham study show that the degree of obesity is proportional to the rate of development of cardiovascular disease. Although there were more overweight people in males (n-20) as compared to females (n=14), but this difference was not statistically significant (p=0.22).

The frequency of regular exercise 40.4% in this group is not comparable with another report of 23%. However, it is felt that this may be an overestimate because our population was well educated and are liable to be aware of the benefits of regular exercise.

The hallmark of cardiovascular disease risk is the synergistic effect of more than one risk factor on overall cardiovascular risk. Even moderate elevations in more than one risk factor increase cardiovascular risk. This study population shows that 16.3% had at least one risk factor, 9.7% two risk factors and 4.8% three major risk factors (smoking, hypercholesterolemia and hypertension).

LIMITATIONS OF STUDY

A convenience sampling was used. This study was targeted highly educated and the upper socio-economic class, which may not be truly representative of the general population, but it will provide some baseline data regarding burden of CHD risk factors. This is a cross-sectional study which cannot make a temporal relationship between the risk factors and CHD.

CONCLUSION

The study results show that proportion of CHD risk factors is quite dominant in this study group. If this is the state among health care professionals, then we can well imagine the state of CHD risk factors in general

population. Media campaigns for preventive health measures like screening for CHD risk factors, maintaining healthy lifestyles and anti-tobacco laws need to be implemented with the help of local government and non-governmental organizations. The preventive measures may help to reduce the frequency of CHD in the country.

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