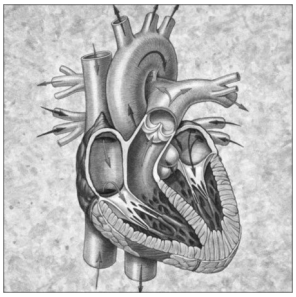
ORIGINAL **PROF-814**
(CLINICAL PRACTICE ARTICLE)

CORONARY HEART DISEASE;
RISK FACTORS ASSOCIATED WITH CLINICAL EVIDENCE AMONG ADULT POPULATION IN MAJOR HOSPITAL IN CHENAB NAGAR



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ABSTRACT..... drkamin2002@yahoo.com **Objective:** To identify risk factors associated with clinical evidence of coronary heart disease (CHD) among adult population reporting in a major hospital, in Chenab Nagar. **Study design:** Case control study **Settings:** Fazle Omar Hospital, Chenab Nagar. **Period:** From Mar 2000 to Jun 2002.Total population is approximately 50,000. Fazle Omar Hospital is the only major hospital in the area. All patients from Chenab Nagar and from suburbs report to the hospital. **Cases:** Men and women of 35 years and above, having CHD, confirmed by history and ECG and/or exercise tolerance test, where indicated. **Controls:** Men and women of 35 years and above, not having CHD as evidenced by history and ECG and/or exercise tolerance test. **Results:** We enrolled 190 cases and 343 controls in our study. Of 190 cases, 96 (50.5%) were males and 94 (49.5%) were females. Age of study subjects ranged between 35 years and 85 years. Mean age was 52.9 years. BMI was almost equal in both cases and controls. Hypertension, smoking, and diabetes were more prevalent in cases. In univariate analysis, males were at a higher disadvantage. Incidence of disease continued to rise with increasing age. Cases were more likely to have family history of CHD, hyperlipidemia, and hypertension. Duration of hypertension was also compared. With increase in duration, incidence increased. Cases were more than 3 times more likely to be smokers. There was a clear dose-response relationship. Diabetes was two times more common in cases than controls.Raised systolic blood pressure, raised diastolic blood pressure, increased levels of serum cholesterol and triglycerides showed positive association with disease. However serum LDL, serum HDL, and BSF levels failed to show any significant difference among cases and controls. The final multi variate model included independent effects of age, family history of CHD, family history of hyperlipidemia, greater duration of HBP, being smoker, and having high serum cholesterol levels. **Conclusion:** Our

study shows that established risk factors are also prevalent in our population. Higher age, being male, heredity, family history of CHD, hyperlipidemia and hypertension were positively associated with CHD. Longer duration of hypertension, smoking and diabetes enhanced the risk. Levels of serum cholesterol and triglycerides were found elevated more in cases compared to controls. HDL and LDL failed to show association with disease.

Keywords: Coronary Heart Disease, Risk Factors, Cholesterol.

INTRODUCTION

Coronary Heart Disease (CHD) is the single common cause of death in the developed world. The incidence rate, risk factors prevalence and morality rate vary widely among the countries. Even in same country, incidence is different in different races and ethnic groups. American Africans have higher incidence of CHD as compared to Whites. Among American Indians not only the rate of CHD is higher than other US population but the disease is found to be more fatal.

Atherosclerosis leading to CHD is complex in origin. Involved in the pathogenesis of atherosclerosis are haemodynamic, thrombotic and carbohydrate-lipid variables, along with intrinsic characteristics of the arterial wall.

A number of conditions and habits are found which are significantly associated with an increased or decreased likelihood of developing coronary disease. These factors are termed “risk factors”. Possible risk factors include:

1. Personal and biological factors (e.g. blood pressure, blood lipids, genetic constitution).

2. Life style features (e.g. physical activity, stress and smoking).

3. Environmental factors (e.g. temperature, rainfall, water quality)[1]

All these factors can interact with each other. The presence of more than one risk factor further accelerates atherosclerosis and hence CHD[3] Traditional risk factors can be divided into risk factors that cannot be changed (age, gender and heredity) and those that can be changed (hyperlipidemia, smoking, hypertension, diabetes mellitus, physical inactivity, obesity, diet and psychological factors).

Elevated levels of serum lipids are the most common and one of the most important risk factors that can be changed[4] The level of Total Cholesterol (TC) is a strong predictor of the development of CHD[5] The increase in cholesterol is associated mainly with a rise in low-density lipoprotein (LDL) concentration. LDL-C is atherogenic and directly related to increase incidence of premature CHD[6]. High density lipoprotein (HDL-C) varies inversely with CHD and is considered anti-atherogenic and protective[7]. Elevated serum triglycerides (TG) are also important and independent risk factor for CHD[8]

Chenab Nagar is a small town in the province of the Punjab. The population of the town is approximately 50,000. As no local statistics are available about CHD, it is our intention to identify risk factors associated with clinical evidence of CHD among adult population reporting to Fazle Omar Hospital of Chenab Nagar, Punjab.

OBJECTIVE

To identify risk factors associated with clinical evidence of CHD among adult population reporting in a major hospital, in Chenab Nagar, Punjab.

MATERIAL & METHODS

Settings: Chenab Nagar is a small town in the province of Punjab. The population of town is 50,000. Fazle Omar Hospital is the only major hospital in the area .It is having 120 beds. All patients from Chenab Nagar and from

suburbs report to the hospital..

Cases: Men and women of 35 years and above, having CHD, confirmed by history and ECG and/or exercise tolerance test, where indicated.

Controls: Men and women of 35 years and above, not having CHD as evidenced by history and ECG and/or exercise tolerance test.

Inclusion criteria:

1. Patients belonging to Chenab Nagar.
2. Residents of Chenab Nagar > 5 years.
3. Age > 35 years.

Exclusion criteria

1. Patient not belonging to Chenab Nagar
2. Resident of Chenab Nagar < 5 year
3. Patient age < 35 years.
4. Comatosed patient
5. Patient refusing consent

Study design: It was a case control study using a case: control ratio of 1:2.
Sample size: 169 cases and 338 controls were included in the study.
Consent:: A verbal consent of the patients was obtained for enrolling in the study

The procedure: Patients attending OPD and emergency room were investigated in detail by history and physical examination. Each study subject was interviewed using the study questionnaire with regard to possible risk factors for CHD. Enrolment No, name, father's/husband's name, age, sex, and occupation of the patient was noted. His/her height and weight was also recorded. Addresses of the patients were noted for follow-up.

Statistical Analysis: Data entry program was developed and data entered and analyzed on SPSS (Statistical Package for Social Science) version 10.0.(9). Statistical significance with a p-value of .05 or less was used. We calculated Odd Ratios (OR) with 95% Confidence Interval (CI). Univariate & multivariate logistic regression analysis was done. Interaction terms were used sequentially before adopting the final multiple logistic regression models.

RESULTS

We enrolled 190 cases and 343 controls in the study. Incidence of disease continued to rise with increasing age. Having 35-44 years age category as reference, cases compared to controls were more likely to be 55-64 years (OR = 4.60, CI 2.67 – 7.90, p < .001) and above 65 years of age (OR = 6.75 CI 3.84 – 11.86, p <.001).

Smoking was also a major contributing risk factor. Cases compared with control were more likely to be smokers. (OR=3.34 95%, CI = 2.07 – 5.38, p < 0.01). Cases were also likely to be smokers for the past ten years or more (OR=3.44, 95% CI = 2.19 – 10.25, p < 0.001). 33.3% of patients were diabetic and longer duration of diabetes was in positive association with CHD. A significant finding was that 56.8% cases were having high serum cholesterol, LDL levels were 1.16 times more likely to be high,31.6% of cases as compared to controls(46.6%) had low HDL levels and 66.6% of cases had increased fasting serum triglycerides levels.

DISCUSSION

This study was designed to identify risk factors associated with clinical evidence of CHD among adult population reporting in Fazle Omar Hospital, in Chenab Nagar, Punjab. The age of study subjects ranged from 35 years to 85 years. Mean age was 52.9, standard deviation ± 11.82 years. It is noteworthy that mean age of our subjects is well beyond 50 years of age and therefore shows a healthy trend among young population. Incidence of disease continued to rise with increasing age. The minimum age group, which is associated with CHD, is 55-64 years. The Framingham study showed that increasing age is a risk for CHD[1] ATP Panel III demonstrates that risk progressively increases with age. Age $\geq$ 45 in males and $\geq$ 55 in females is considered a risk[10]. Results of our study are comparable with above findings.

Males were at a higher disadvantage with regard to CHD in our study. This is quite consistent with other studies like that of Shaper[1] and Gandapur et al[11]

Heredity plays an important role in causation of CHD as Shaper AG has mentioned[1]. Higgins has observed that CHD and many risk factors cluster in families. He also mentioned that dyslipidemias are very common in blood relatives of patients with early onset CHD[12].Our study shows that cases are about three times more likely to have family history of CHD. Family history of hyperlipidemia and family history of hypertension was positively associated with CHD. Longer duration of hypertension showed a strong positive association with CHD .Ramachandran A et al[13] and Gupta et al[14] observed prevalence of hypertension was significantly higher in patients of CHD. The Framingham Study shows that the risk increases with increasing blood pressure. Overall risk tends to be two or three times higher in hypertensive than in normotensives[1]

Smoking trend is increasing all over the Third World. Our study showed 26.8% of cases as compared to 9.9% of controls were cigarette smoker. Longer duration of smoking was having a positive association with CHD. Cases were about three times more likely to be smoker for $\geq$ ten years. There was a clear dose-response relationship with regard to number of cigarettes smoked per day. Other researchers have reported similar results. Gotto et al mentioned that relative risk had a positive correlation with duration and number of cigarettes smoked[15]. Lee et al observed increased risk for CHD in cigarette smokers of $\geq$ 20 packs year in Asian Indians[16]

Diabetes increases the risk of atherosclerosis. Gupta et al showed high prevalence of CHD in diabetics[14] In Framingham Study, diabetic patients have three to fivefold increased rate of CHD[17]. whereas Haider et al observed evidence of CHD in only 9% of diabetics[18] We found that 35.3% of cases were diabetic. Cases were two times more likely to be diabetic. Longer duration of diabetes for $\geq$ 10 years was in positive association with CHD in univariate analysis. These results were not significant in final multivariate model due to interaction of other stronger risk factors.

A significant finding was that 56.8% cases were having high serum cholesterol levels. Cases were about two times likely to have serum cholesterol > 5.2 mmol/l. It was significantly associated with CHD in our study.

Results from other clinical trials parallel these findings. Framingham[19] and others studies (e.g. done by Mohan et al[20] Pikkanen et al[21]) also showed that hypercholesterolemia has positive association with CHD. A multi-center study by Pakistan Medical Research Council[22] and Gupta et al[12] indicated a high cholesterol level in patients of CHD.

In our study cases with high LDL levels did not show any association in the final model. Even in our univariate analysis cases were 1.16 times more likely to have LDL levels $\geq$ 2.6 mmol/l but these results were statistically not significant (p = 0.16). Lee et al[16] observed a higher risk of CHD with LDL (OR = 1.5, 95% CI = 1.0 – 2.1). Results of our study confirm the above mentioned observation.

Low HDL levels (< 40 mg/dl) were observed in only 31.6% of cases as compared to controls (46.6%). Cases were 0.528 times more likely to have low HDL (95% CI = 0. 364 – 0.766, p = < 0.001). HDL levels didn't show any significant association with CHD. This is in contrast to epidemiological studies like Framingham Study[19] and others conducted by Mohan et al[20] and Gupta et al[14].As mentioned for LDL; the reason may be that coronary patients were taking lipidlowering agents. Also these patients were more conscious about diet and exercise.

66.3% of cases were having increased fasting serum triglyceride levels. Though it was not a significant finding in our final model, but in our univariate analysis cases were 1.5 times more likely to have serum triglycerides more than 1.7 mmol/l (p = 0.024). Previous studies report similar findings. The Framingham Study suggested that elevated TG levels are important risk factor for CHD[19]. Sprecher[2] and Gupta et al[14] confirmed this statement. Lee et al observed a relative risk 1.5 in patients with high TG levels[16] .

Table-I. Demographic characteristics distributed among cases and controls for the hospital based study of risk factors associated with clinical evidence of CHD among adults.

Variable	Control		Cases	
	No of cases	%age	No of cases	%age
SEX				
Female	220	64	94	849.50
Male	123	36	96	50.5
AGE GROUP				
35 to 44 years	129	37.6	28	14.7
45 to 54 years	109	31.8	37	19.5
55 to 64 years	62	18.1	62	32.6
65 and above	43	12.5	63	33.2
BMI GROUP				
<25	47	42.9	78	41.1
25-30	149	43.4	84	44.2
>30	47	13.7	28	14.7
HYPERTENSION				
No	216	63	75	39.5
Yes	127	37	115	60.5
BEING SMOKER				
No	309	90.1	139	73.2
Yes	34	9.9	51	26.8
DIABETIC				
No	258	75.2	123	64.7
Yes	85	24.8	67	35.3
History of Exercise				
No	272	79.3	122	64.2
Yes	71 (20.7)		68	35.8

CONCLUSIONS

Our study shows that established risk factors are also prevalent in our population. It became evident that multiple risk factors interact with each other. So we found that high prevalence of family history of hyperlipidemia,

CHD, smokers in higher number and for longer duration, higher age, longer duration of blood pressure and having high serum cholesterol were independent risk factors associated in adults with clinical evidence of CHD in Chenab Nagar. Followup studies may be warranted for more insights into the risk factors associated with CHD in Chenab Nagar.

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