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Coronary Heart Disease, A Gift of Modern Civilization

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ABSTRACT

Coronary heart disease (CHD) is a leading cause of death in India. So, the aim of our study is to find out the association of various risk factors like BMI, diabetes, smoking, hypertension, dyslipidemia, family history, physical activity, socioeconomic status & association of diet with CHD. The study subjects were 150 clinically diagnosed patients suffering from CHD & 50 healthy controls of both sex & varying age groups, we have found that 61% of males & 68% of females having CHD were having family history of CHD, 68% males & 55% females having CHD were hypertensive, 31% males & 41% females having CHD were having diabetes, 79% males & 57% females having CHD are smokers, 34% males & 39% females having CHD are obese, 61% males & 50% females CHD patients are having dyslipidemia, we also found positive co-relation of socioeconomic status, physical activity & diet with CHD.

Introduction

Coronary heart disease has long been the leading cause of death in developed countries, and it is rapidly become the number one killer in the developing countries [1]. Every year, >1 million people in the United States and >19 million others worldwide experience a sudden cardiac event (acute coronary syndromes and/or sudden cardiac death). prevalence of coronary heart disease (CHD) in adult surveys has risen four-fold in 40 years and even in rural areas the prevalence has doubled over the past 30 years [2]. The risk of coronary heart disease increases with age because narrowed arteries [3]. Through early middle age, coronary heart disease is more common in men. Women are more likely to develop CHD after menopause [4]. People who have a parent who developed coronary heart disease before the age of 60 years have a higher risk of developing it themselves, compared to other individuals [5]. High blood cholesterol levels makes the build-up of plaques and consequent atherosclerosis more likely. High cholesterol can be caused by high LDL (low-density lipoprotein) levels or low HDL (high-density lipoprotein) levels. LDL is also known as the bad cholesterol, while HDL is also known as the good cholesterol [6].The lumen (the channel through which blood flows in the blood vessels) becomes narrower as the arteries thicken and harden, increasing blood pressure and cause coronary heart disease [7]. Both types of diabetes are linked to a higher risk of developing coronary heart disease, especially Diabetes Type II, which is often caused by obesity [8].Obese people have a higher risk of developing coronary heart disease [9] and People who lead very sedentary lives has a higher risk of developing coronary heart disease [10]. Diet abundant in fruits and vegetable help to lower the significance of coronary heart disease. Non vegetarian diets have higher level of cholesterol, saturated fats so it increases CHD [11].

Material and Methods:

After taking ethical clearance of the study from the institutional ethical committee, patients were selected from Medicine O.P.D, I.P.D and emergency ward of department of Medicine, NIMS Hospital and Medical college Shobha Nagar Jaipur. The total no of subjects were 200, out of which 150 subjects are clinically diagnosed patients suffering from CHD of both sex and varying age groups & 50 healthy controls are volunteers such as paramedical staff, healthy relatives / attendants of patients

Inclusion Criteria:

The patients who are diagnosed as having CHD by clinical cardiologist on the basis of symptoms, treadmill test (TMT) and echocardiography results.

Exclusion Criteria:

Patients with renal, thyroid disorders and with negative TMT.

Collection and analysis of sample

Five ml of venous blood sample was collected in plain vials, allowed to clot for 30 minutes at room temperature and then centrifuged at 3000 rotations per minute (r.p.m) for 10 minutes to obtain clear unhemolysed serum. BMI was expressed as weight divided by square of height (Kg/m^2) [12]. Hypertension was defined as a diastolic B.P ≥90 mm Hg, systolic B.P ≥ 140 mm Hg, The patients who had total cholesterol level of >250 mg /dl or triglycerides concentration >200 mg/ dl, or receiving lipid lowering drugs were defined as having hyperlipidemia. Diabetes mellitus was diagnosed if the fasting plasma glucose concentration was ≥126 mg /dl or if the patient was treated with insulin or oral hypoglycemic agents. Obesity was defined as a body mass index ≥ 27 kg/m2 [13] , socioeconomic status and Physical activity of an individual was assessed and categorized [14] , [15].

Statistical analysis

Statistical analysis was done, using the statistical package for social science (SPSS 16). Differences in the parameters between the groups were analyzed by means of the t test. Variables were presented as mean ± standard deviation (S.D.). Chi-square (x^2) analysis was used for composition of groups. The $P \leq 0.05$ value considered to be significant.

Results:

In our study of CHD subjects we have found that male to female ratio is 1.68:1, study Shows [number (%)] that 57 (61%) cases had family history of CHD, 64 (68%) hypertension, 29 (31%) diabetes, 74 (79%) smokers, 32 (34%) obesity, and 57 (61%) dyslipidemia in male subjects and 38 (68%) cases had family history of CHD, 31 (55%) hypertension, 23 (41%) diabetes, 32 (57%) smokers, 22 (39%) obesity and 28 (50%) dyslipidemia in female subjects (Table.1).

Table 1:- Distribution of Coronary Heart Disease subjects with Risk Factors

No. of subjects M/F	Family history of CHD n (%)	Hypertension n (%)	Diabetes n (%)	Smoker n (%)	Obesity n (%)	Dyslipidemia n (%)
Male (n=94)	57 (61.00)	64 (68.00)	29 (31.00)	74 (79.00)	32 (34.00)	57 (61.00)
Female (n=56)	38 (68.00)	31 (55.00)	23 (41.00)	32 (57.00)	22 (39.00)	28 (50.00)

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The distribution of healthy control & CHD subjects in various age groups has been shown (Table. 2)

Table 2. Gender wise distribution of subject with in different age group

S. No.	Group studied	Sex	Age groups (age in year) Number of Male / Female subjects (%)				Total
			31-40 n (%)	41-50 n (%)	51-60 n (%)	61-70 n (%)	
1.	Healthy control (n=50)	Male (n=30)	9 (30.00)	9 (30.00)	7 (23.00)	5 (17.00)	30 (60.00)
		Female (n=20)	6 (30.00)	7 (35.00)	3 (15.00)	4 (20.00)	20 (40.00)
2.	CHD subjects (n=150)	Male (n=94)	14 (15.00)	28 (30.00)	33 (35.00)	19 (20.00)	94 (63.00)
		Female (n=56)	2 (4.00)	8 (14.00)	30 (54.00)	16 (28.00)	56 (37.00)

(Table3.) Shows, Mean ± SD [Range (Min-Max)] value of BMI in control and CHD subjects, Non significant results were obtained on comparing BMI between males and females of healthy controls and CHD subjects respectively.

Table3. Comparison of BMI in healthy control and CHD subjects

S. No.	Group studied	BMI (mean ± S.D.) in years (minimum - maximum)			Statistical significance	
		Male	Female	Total	M v/s F	Healthy control v/s CHD Subjects
1.	Healthy control subjects (n=50, M=30, F=20)	23.0±2.34 (17.8-23.4)	21.9±2.9 (16.0-24.8)	22.9±2.5 (16.6-24.8)	t=1.25 P=0.194 *NS	t=6.04 P=0.032 ^S
2.	CHD subjects (n=150, M=94, F=56)	26.3±3.4 (16.7-32.6)	26.0±3.7 (16.5-31.7)	26.3±3.43 (16.5-32.6)	t=0.48 P=0.70 NS	

^S –Significant, *NS- Non Significant

Our study shows 56% of CHD subjects and 42% of healthy control subjects belonged to middle income group, while 27% of case subjects and 22% of healthy control belonged to middle higher income group but only 17% of CHD subjects and 36% of healthy control group belonged to lower income group. In our study according to physical activity 52.67% of CHD subjects are leading sedentary life style, 31.30 % of CHD subjects are having moderate physical activity and 16% of CHD subjects are under heavy physical activity, we have also found that 27% of vegetarian and 73% of non vegetarian are having CHD, Chi- square analysis in different groups regarding the SES, physical activity and diet was significant.

Table.4. Comparison of healthy control and CHD subjects according to Socio-economic status, Physical Activity and Diet.

Category		Group Studied n = 50	Healthy control subjects		CHD subjects		Healthy control v/s CHD Subjects (Statistical Significance)
			(%)	n = 150	(%)		
Socioeconomic status		Lower income group	18	36.00	26	17.00	χ^2 (chi square) =7.6 P =0.022 S
Middle income group			21	42.00	83	56.00	
Middle higher income group			11	22.00	41	27.00	
Physical Activity	Sedentary activity		10	20.0	79	52.67	χ^2 (chi square) =2.75 P ≤0.0001 S
	Moderate activity		12	24.0	47	31.3	
	Heavy activity		28	56.0	24	16.0	
Diet	Vegetarian		35	70.0	41	27.0	χ^2 (chi square) =12.93 P ≤0.001 ^S
	Non Vegetarian		15	30.0	109	73.0	

^S –Significant

Discussion:-

In a study conducted by Yoon *et al.,* showed family history, a well-known risk factor for CHD [5]. Which is in accordance to our study which states that 61 % males & 68 % females have positive family history of CHD, in our study we have found that 68% males and 55 % females having CHD were hypertensive which is in accordance with the study of Gupta et.al [7]

Another study states that the increasing use of tobacco in a number of developing countries will also translate into higher mortality rates of CHD [16]. Our results correlate with these studied that 79% males and 57% female's smokers are having CHD, in the present study the percentage distribution of CHD subjects is higher in age range 51-70 years. Kamili *et al.* [3] in a study also found prevalence of CHD is highest in the age group of 60 years and above.

Our results indicate that increased BMI is associated with obesity. Similarly a study that has been done in seven Asian population and five Latin American population, found significant positive relationship has been found between BMI and CHD [17].

Our study shows that Physical exercise has been inversely associated with CHD risk, it reduces the risk of obesity, blood lipid abnormalities, hypertension and non-insulin dependent diabetes mellitus , which is in accordance with the study of Rastogi *et al.*[18]. Our findings highlight the adverse health consequences of non-vegetarian diet as compared to vegetarian diet, which is in accordance with the study of Rastogi *et al.*[11] who observed a significant and dose-dependent inverse association between vegetable intake and CHD risk.

Conclusion:

Modification of risk factors through changes in diet, increased physical activity, tobacco use cessation, and pharmacotherapy (when needed) can reduce CHD risk considerably for the majority of the population.

We hope to extend the study in terms of the role of oxidants, aqueous phase & lipid phase antioxidants on the larger cross section of population with reference to CHD

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