

Role of Dietary Factors and Lipid Profile in Hospitalized Patients in Coronary Heart Disease in Hyderabad, India

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ABSTRACT The study was conducted with 49 coronary artery disease confirmed inpatients admitted in Nizam's Institute of Medical Sciences, Hyderabad and 24 matching controls to correlate the dietary patterns with lipid profiles. Detailed information on their dietary habits and behavioral parameters were collected through a structured questionnaire. Food intake was assessed by the 24 hour recall method and blood samples were drawn after 12 hours of fasting and analysed for lipid profile by enzymatic colorimetric method. Results of the study have indicated that coronary artery disease patients were obese and risk factors such as smoking (24 percent), alcohol consumption (8 percent), pan chewing (4 percent) were observed among the patients. Lipid profile of the control and coronary heart disease patients indicated significantly higher levels of total cholesterol, triglycerides and LDL levels when compared to control. The mean triglycerides (228 mg/dl and 143.66mg/dl) and LDL (137 mg/dl and 119.74 mg/dl) and HDL (34 mg/dl and 38 mg/dl) were seen in patient and control population respectively.

INTRODUCTION

Coronary heart disease has become one of the major leading causes of morbidity and mortality in India. Biomedical research all over the world is directed towards the prevention of heart disease at an early stage itself. Attempts are being made to define living habits that might be associated with an increased risk (Krishnakumar 1998). It is estimated that in the coming decades, these diseases would constitute a major public health problems if adequate preventive measures are not initiated and actively implemented. Pre-disposing coronary heart disease (CHD) risk factors promote the development of major and conditional CHD risk factors, which may be direct causes of CHD (Grundey et al. 2000).

Several life style factors including diet, environmental factors and the genetic pre-disposition result in the initiation and progression of atherosclerosis and thrombosis. Extensive research has documented that diet plays a key role in these pathological processes. Often faulty dietary habits over decades trigger an underlying genetic tendency to heart disease (Oliver 1990). The subject of lipids and atheromatous vascular disease has received considerable attention in research.

Some aspects of this involvement are known, while a lot is yet to be learned (Krishnaswami 1989). Poor lifestyle factors are thought to account for an increase in BMI, indirectly affecting the clustering of CHD risk factors. Lifestyle factors such as eating unhealthy foods and physical inactivity may contribute to the development of overweight status (Goran 2001; Hill and Melanson 1999). Hence, the following study which has been done over a period of six months establishing the role of dietary factors and lipid profile in hospitalized patients in coronary heart disease in India with the objective to correlate dietary patterns with lipid profiles in patients with CHD, and to establish cross- correlations between lipid levels and dietary patterns prevalent in the sample population admitted in Nizam's Institute of Medical Sciences.

MATERIAL AND METHODS

The study was conducted on 49 patients who had CAD confirmed by coronary angiography (38 male and 11 female) with ages between 29-75 years and on 24 control (18 male and 6 female) with ages between 26-45 years in Nizam's Institute of Medical Sciences, Hyderabad, India.

Anthropometric measurements included body weight which was measured on standard scales with the subject wearing minimal clothing and without slippers to the nearest 100g, and body height which was measured to the nearest cm. BMI was calculated as weight (kg)/ht (m²) and used as a measure of obesity (Jelliffe 1966).

Nutrient and total calorie intakes were estimated by 24h dietary recall interview method and their behavioral parameters which included smoking, alcohol and pan chewing. The questionnaire was then elaborated to calculate the daily intake of proteins, lipids, carbohydrates, calories and cholesterol based on tables furnished by the National Institute of Nutrition (Raghuramulu et al. 1989). Cigarette smoking data was also collected including the number of cigarettes smoked per day, and frequency of consumption of alcohol and the usual amount consumed was also taken into consideration using a pretested schedule.

Total calorie expenditure (kcal/day) was calculated from activity patterns including BMR (basal metabolic rate) and physical activity for 24 hours and cross checked against the standard tables published by National Institute of Nutrition. Venous blood specimens of 5 ml were collected after a 12 hour overnight fasting in supine position from each subject in plain tubes and immediately analysed within the hour for lipid profile. Lipid profile analysis was done by the enzymatic calorimetric method on an ERBA chem.-auto analyser (Transasia). Serum total cholesterol and HDL was measured by CHOD – PAP method and triglycerides by GPO-PAP method.

RESULTS AND DISCUSSION

The study was conducted on 49 patients who had coronary artery disease confirmed by coronary angiography out of which 38 were male, 11 were female, and 24 control with 18 males and 6 females. All the patients were from Nizam's Institute of medical sciences, India.

When comparing the experimental and control results it is clearly evident that the experimental group fell in the overweight and obese status whereas the control were normal (Table 1). Ample studies by other workers too had shown the fact that obesity is a major pre-disposing factor for diseases related to the heart (Ghafoorunnisa 1994). The nutrient and total calorie intakes were estimated from 24 h dietary

recall interviews, using a pretested questionnaire, with each patient and the spouse also included in the interrogation.

Table 1: Age, anthropometric parameters in the selected sample and control group

	<i>Patients</i>	<i>Control</i>
Mean	N = 49	N = 24
Age (yrs)	52	35.5
Weight (kg)	68	65
Height (cm)	166.5	166.5

Total calorie expenditure (Kcal/day) was calculated from activity patterns including basal metabolic rate and physical activity for 24 hours and cross- checked against the standard tables NIN (1989). The mean 24 hour percent intake of carbohydrates in experimental group was found to be 57.48 and 50.28 in the control group. Similarly, the protein intake seen was 24.44 percent and 18.97 percent and fat intakes was 37.22 percent and 30.94 percent in the experimental and control group respectively. It was seen that the calorie contribution of all the dietary constituents in the experimental group is higher when compared to the control, which seems to be a clear indication that the experimental group was consuming extra calories than required, to their activity and creating a burden to the already weak heart.

The actual dietary cholesterol intake was seen to be 64.25 percent and 33.12 percent in the experimental and control group respectively (Table 2). Venous blood specimens of 5ml were collected after 12 hour overnight fasting in supine position from each subject in plain tubes and immediately analysed within the hour for lipid profile. Lipid profile analysis was done by the enzymatic calorimetric method on an ERBA chem- auto analyser. As seen in Table 3 the total cholesterol, LDL and triglycerides were higher

Table 2: Daily mean intake of sample population and their calorie contributions by dietary constituents

<i>Nutrient</i>	<i>N=49</i>		<i>N=24</i>	
	<i>Experimental</i>		<i>Control</i>	
	<i>Daily intake</i>	<i>%</i>	<i>Daily intake</i>	<i>%</i>
Carbohydrates (gm)	217.14	57.48	229.53	50.28
Proteins (gm)	92.58	24.44	86.62	18.97
Fat (gm)	62.67	37.22	62.75	30.94
Calories (Kcal)	1515.18	-	1825.77	-
Dietary cholesterol (mg)	131.13	64.25	138.04	33.12

in the experimental group when compared to control.

Table 3: Variations of lipid profile in sample population

Lipid	Experimental	Control	Normal
Mean cholesterol	211.98	184.04	150-200
Mean triglycerides	228.09	143.66	60-165
Mean HDL	34.52	37.79	35-55
Mean LDL	136.48	119.74	60-160

The data was analysed statistically between the blood lipid profiles and dietary cholesterol in the experimental and control group and depicted in Table 4. There was a significant positive correlation as seen in the results between experimental and control group. Apart from calculating the intake of dietary constituents, cigarette smoking data, alcohol and *paan* (betel leaf) consumption was also taken into consideration which were also seen to be the predisposing factors of heart ailments.

Table 4: Correlation between blood lipid profile and dietary cholesterol

Lipid	Correlation coefficient <i>r</i>	
	Experimental	Control
Total cholesterol	0.1623	0.199
HDL	0.218	0.088
LDL	0.107	0.1087
TGs	0.135	0.2431
Vldl	0.18	0.2431

Several studies have been conducted by Armellini et al. (1993), Easwaran and Chandra (1991) deducing the facts that smoking and alcoholism already established increases in lipid fraction levels and could be one of the risk factors of heart disease. As seen in Table 5, it was clear that 76% of the experimental group were habituated to the behavioural parameters of smoking, alcoholism and *paan* chewing which could be attributed to cholesterol and triglycerides, which are to be seen in Table 6.

Table 5: Percentage values of the behavioral parameters in the sample population

Parameter	Experimental (%)	Control(%)
Smoking	24.48 (12)	-
Alcohol	8.16 (4)	-
Smoking and alcohol	14.28 (7)	8.33 (2)
Pan chewing	4.08 (2)	-
None	48.97 (24)	91.66 (22)

Figures in parenthesis indicate number.

Table 6: Correlation between dietary constituents and serum cholesterol

Lipid	Correlation coefficient <i>r</i>	
	Experimental	Control
Carbohydrate	0.1164	0.222
Protein	0.116	0.0632
Fat	0.295	0.0223
Dietary cholesterol	0.1623	0.199

The exact relationship between the present diet intake and serum cholesterol levels is shown in Table 6 where the fat and dietary cholesterol did not have any statistically significant relation on the serum cholesterol levels whereas the carbohydrate intake, and proteins appeared to have a significant relationship with the present serum cholesterol levels.

CONCLUSION

In conclusion, it could be mentioned that lipids are an important part of the disease process in patients with CAD. The age, weight and other behavioral modifications of the sample population might have further contributed to the development of the heart disease due to the free radical formation which causes damage to the tissues. This study clearly indicates the need to educate the patients for a change in better life style and dietary modifications.

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