

# Coronary Heart Disease Risk Factor In Higher Socio-Economic Class Of Rawalpindi/Islamabad Areas

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## SUMMARY:

Three hundred seventeen subjects belonging to higher socio-economic class of Rawalpindi/Islamabad areas were studied in National Institute of Health, Islamabad for Cardiac Heart Disease (CHD) risk factor by estimating LDL-C/HDL-C ratio, using electrophoretic technique. 24.63 per cent subjects were found to have more than average risk.

## INTRODUCTION:

Cardiovascular disease, especially atherosclerotic heart disease and stroke are leading causes of mortality in the world and probably same is true in Pakistan. The relationship between nutrient intake and blood lipids and lipo-protein cholesterol levels is of interest because of the latter's association with coronary heart disease (CHD)<sup>1</sup>. Low density cholesterol (LDL-C) level has been shown to be a major risk factor for coronary heart disease in animal studies, clinical trials and observational epidemiological studies<sup>2</sup>. Recent indications that high density lipo-protein cholesterol (HDL-C) may be protective factor in contrast to risk associated with elevated levels of cholesterol (LDL-C) have stimulated interest in the relationship between nutrient intake and these two lipo-protein fractions<sup>1</sup>. Plasma cholesterol having a dietary and synthetic origin, is distributed as free and esterified, among different lipo-proteins. Moreover esterified cholesterol can also be exchanged and various complex mechanisms participate in the molecular conversion of lipo-protein<sup>3</sup>. The studies conducted provides a sufficient evidence that HDL-C is the powerful lipid predictor of CHD. The risk for CHD increase as the HDL-C levels are decreased<sup>4</sup>.

twin cities of Rawalpindi and Islamabad. These two cities are most advanced as compared to other cities of the Punjab. Almost all types of food and food products are abundantly available. It was, therefore, considered worthwhile to assess the risk for CHD in a population based sample of individuals belonging to higher socio-economic class.

## MATERIAL AND METHODS:

The study includes 317 apparently normal healthy subjects. 268 males and 49 females, belonging to higher socio-economic groups of Islamabad (High Civil officials, businessmen, lawyers etc.) of Rawalpindi and Islamabad. The social status was determined according to the nature of work and the income. The age range for male subjects was 40-59 years and for female subjects the age ranged 30-55 years. The subjects reported to National Institute of Health, Islamabad as a part of their general checkups programme. Fasting (10-12 hour fast) blood sample from subjects were obtained. 5.0 ml of venous blood was drawn into 0.1% ethylenediamine-tetragastic acid and plasma obtained by centrifugation at 3000 rpm for 30 minutes at 4°C. Separated plasma was stored at 4°C until analysis.

The present investigation has been conducted in

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The total cholesterol was determined by the enzymatic method<sup>5</sup>. HDL-C and LDL-C was estimated by electro-phoretic method<sup>6</sup>. Each estimation was performed in duplicates. At regular intervals the reliability of the procedures was tested with commercially available serum containing known contents of parameters analysed.

**RESULTS:**

Mean value for total cholesterol and for each lipoprotein fractions in plasma of 268 male and that of 49 female subjects are shown in table 1. The pooled data was compared for the variables determined among male and female subjects by applying students test and was found to be (0.01>p) non significant.

**TABLE-1.**

Mean concentration of total cholesterol and lipoproteins  
(mg/dl Plasma)

Variable	male (n=268)	female n=49
Total Plasma Cholesterol	225.43 ± 54.24 (214.5 ± 36.0)	217.23±55.72 (216.0 ±34)
LDL-Cholesterol	142.70 ±40.11 (135.0 ±33.0)	126.86±30.10 (130.0±30.0)
HDL-Cholesterol	51.06 ±19.55 (46.0 ±12.)	57.80 ±13.40 (65.0 ±17.0)

Figures in parenthesis are mean expected values ± SD published by Fredrickson et al.

The subjects were classified, according to the assessment criteria used at Framingham Heart Institute<sup>7</sup>. The details are given in table 2. The LDL-C/HDL-C ratios for each subject were calculated. On the basis of expected values of LDL/HDL cholesterol ratio, the number and percentage of subjects were identified for having risk for CHD of different averages. 95.92 per cent of female subjects have average risk, whereas; 4.08 per cent females were found to have 1/2 average risk. None of the females were found to have 2 x average or 3 x average risk.

In male subjects 74.25 per cent were having average risk and 19.78 per cent of male subjects having 2 x average risk, whereas 4.85 per cent were found to

have 3 x average risk for CHD. The ranges and mean values for HDL-C (viz risks are shown in table 2.

**TABLE-2.**

Showing number of subject (males and females) and their percentage of risk for CHD.

Risk	Expected Value HDL-C xx HDL-C	Subjects No. of cases	Percentage
<b>MALES</b>		<b>268</b>	
1/2 average	1.00	3	1.12
Average	3.55	199	74.25
2 x average	6.25	53	19.78
3 x average	7.99	13	4.85
<b>FEMALES</b>		<b>49</b>	
1/2 average	1.47	2	4.08
Average	3.22	47	95.92
2 x average	5.03	None	None
3 x average	6.14	None	None

xx Norms developed by Framingham Heart Institute.

**DISCUSSION:**

The present study was designed to investigate the CHD risk in subjects belonging to higher socio-economic status. The results of this study demonstrate that total cholesterol and lipo-protein fractions are comparable with the findings of similar study conducted in Boston, USA, the purpose of the study was to evaluate inter-relationships between blood lipids levels and other risk factors for myocardial infarction. The control subjects have total cholesterol 213 ± 41 mg/dl LDL-C 140 ± 39 mg/dl and HDL-C 42 ± 12 mg/dl<sup>2</sup>.

Slightly lower cholesterol levels have been reported for Indian state of Punjab (Werner; G.T, Sareen. D.K.



1978)<sup>8</sup>, the slight variation may be attributed to different dietary habits as the Indian consumes predominantly vegetarian diet. Whereas; in our, part of Punjab the diet consumed is more meat oriented.

In our study total plasma cholesterol level in male and female population is similar. Females have slightly high HDL-C level but slightly lower LDL-C than males (table-1) Khan et al have also reported that women generally have higher HDL-C than men. This may explain why women are much less susceptible to CHD than men. The HDL-C levels found in the female subjects in the present study was 57.80 mg/dl. Which is almost the same as that of sedantary control of the study reported by Khan et al.<sup>9</sup> Our data indicate that the female subjects belonging to higher socio-economic state do not involve themselves in extra-physical activities etc.

The data collected as a part of joint US-USSR LRC programme showed that USSR males had significantly higher mean HDL-C 53.0 mg/dl than US males 42.2 mg/dl. Two countries had similar mean LDL-C level 146.6 and 143.2 mg/dl respectively. The mean levels of HDL-C and LDL-C in our male subjects were 51.6 mg/dl and 142.7 mg/dl<sup>1</sup>. Both HDL-C and LDL-C levels of Pakistan male subjects are close with US males. Which indicates that male population of higher socio-economic class is probably comparable to some extent with average US male.

It is suggested by (Khan et al; a Glueck CJ.<sup>9,10</sup>) that the lipoprotein cholesterol ratios are strong predictors of CHD. It is worthwhile to determine the risk ratios in population instead of analysing the total cholesterol. This would serve as an early warning monitoring system which may be helpful in reducing the morbidity and mortality of CHD.

The CHD risks were calculated by dividing the LDL-C by HDL-C. Our data (table-2) showed that males are at higher risk than females. About 20 per cent of male population is carrying 2 x average risk and about 5.0 per cent is carrying 3 x average risk. While there is no female in these classes of risk for CHD.

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