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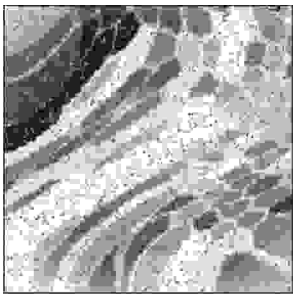
DIETARY EFFECTS ON HEMO-LIPID PROFILE;

IN UNIVERSITY STUDENTS OF MIDDLE INCOME GROUP



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ABSTRACT... faiqafayyazzz@yahoo.com A study had been being undertaken to estimate the dietary effects on blood lipid profile of young male and female university students. Lipid profile is a group of tests that are often ordered together to determine risk of coronary heart diseases by estimating blood cholesterol, low density lipoprotein (LDL), high density lipoprotein (HDL) and triglycerides. For the estimation, blood samples of each 30 female and male volunteers had been centrifuged and plasma had been separated for analysis. Levels of lipid profile parameters had been measured by recommended kit method and color developed had been measured by spectrophotomer. The results had been presented as mean±SD. Female volunteers had an average±SD value for cholesterol 183.1±14.8, for triglycerides 183.2±22.5, for HDL 51±6.2 and for LDL 95.5±15.7, whereas male volunteers had an average ±SD value for cholesterol 190±14.9, for triglycerides 222.5±18.2, for HDL 41.4±5.8 and for LDL 104.2±17.1. It had been concluded that values of triglycerides and cholesterol were higher than the normal values for both female and male volunteers because the content of saturated fatty acids was higher in their diets, use of vegetables, fruits and fruit juices was very low, in some cases the number of meals taken per day was more than 5 which is not desirable in adult people especially when their lifestyle is sedentary and in some cases smoking altered the levels of cholesterol and triglycerides.

Key words: Lipid profile, Dietary effects, Middle income, University students

INTRODUCTION

Blood lipid profile is a useful tool in determining risks for cardiovascular diseases. Total cholesterol, High density lipoprotein (HDL), low density lipoprotein (LDL) and triglycerides were measured for the estimation of blood lipid profile. There was good evidence that high blood cholesterol is associated with an increased risk of atherosclerosis and is responsible for cardiovascular diseases. Despite the fact, cholesterol is not bad itself. Our bodies make about 2g cholesterol/day and that makes 85% of blood

cholesterol while only 15% comes from dietary sources[1]. Cholesterol level is affected by one's diet and individual rate of metabolism. Normal value for cholesterol is 130-222 mg/dl[2]. There are main two categories of lipoproteins, distinguished by how compact they are. Low density lipoprotein or LDL is bad cholesterol being associated in deposition of cholesterol on the walls of arteries and high density lipoprotein or HDL is good cholesterol being associated in carrying cholesterol out of the blood system and is more compact than LDL. Triglycerides are used in body mainly to provide energy for different metabolic processes. This function they share almost equally with carbohydrates. However, some lipids especially cholesterol, phospholipids and their derivatives are used throughout the body to provide other intracellular functions[3]. Pakistan is a developing country. The people of this country have less knowledge about the causes of coronary heart diseases. Pakistani diets with their high fats, high cholesterol, increase calories, low sodium and low fiber content are a boon for atherosclerosis and cardiovascular diseases. Keeping in view the importance of effects of dietary patterns on plasma cholesterol level as one of the risk factors of cardiovascular diseases and other related diseases, the project had been assigned to compare dietary effects on blood lipid profile of young male and female university students belonging to middle income group.

MATERIALS AND METHODS

In order to determine blood lipid profile of university students belonging to middle income group blood samples had been collected for 30 male and 30 female volunteers aged between 19-26 years. Sixty blood samples (random) of 5 ml had been obtained from the arm vein of each subject and immediately transferred to laboratory and plasma had been separated by centrifuging at 4000 rpm for 10 min. The plasma had been preserved in a refrigerator at 4°C till analyzed.

Demographic Measurements:

Age, weight, height, blood pressure, body temperature of volunteers had been recorded by using Performa.

Anthropometrical Measurements:

Body Surface Area (BSA), Body Mass Index (BMI), Lean Body weight (LBW) and Ideal body weight (IBW) had been calculated by using the following formulae:

$$BSA = 0.20247 \times Height\ (m)^{0.725} \times Weight\ (kg)\ 0.425$$

$$BMI = \frac{Weight\ (kg)}{Height\ m^2}$$

LBW (men) =(1.10 x weight (kg))-128 (weight^2 x (100 x height (m^2))

LBW (Women) =(1.07 x weight (kg)) - 148 (weight^2 x (100 x height (m^2))

IBW (men) = 50 + 2.3 (Height (m) -60)

IBW (women) = 45.5 + 2.3 (Height (m) - 60)

Analytical Procedure

Plasma samples had been analyzed for total cholesterol, triglycerides and HDL while LDL was calculated by using the Friedwald Formula[4].

$$LDL = Total\ cholesterol - HDL - \frac{TGA\ (mg/dl)}{5}$$

Determination of Cholesterol

Cholesterol in plasma had been analyzed by using kit method (No. 10017). Calculations for the concentration of cholesterol mg/dl in plasma had been made by the formula:

$$Concentration\ Cholesterol = \frac{Abs \times 200\ (mg/dl)}{Abstd}$$

Determination of triglycerides

Triglycerides in plasma were analyzed by using kit method (No. 10164). Calculations for the concentration of triglycerides mg/dl in the plasma were made by the formula:

$$Concentration\ triglycerides = \frac{Abs \times 200\ (mg/dl)}{Abstd}$$

Determination of HDL

HDL in plasma had been determined by using kit method (No. 10018). The concentration of HDL cholesterol in the plasma had been calculated by formula:

Concentration of HDL (mg/dl) = 180 x Abs

Statistical Analysis

The results of blood lipid profile had been presented as average ±SD and correlation between parameters had been examined by regressional correlation analysis by using Microsoft Excel Software.

RESULTS & DISCUSSION

This study had been conducted to compare blood lipid profile in 30 female and 30 male volunteers with their dietary patterns. Present study was showing that the value of blood pressure for male volunteers was higher than female volunteers. Individuals with many adverse life style risk factors present were at increased risk of having an atherogenic lipid and blood pressure profile[5]. The reason of this variation was due to different life style patterns, eating habits, physical activity, smoking etc. Comparison of demographic data of females and male volunteers is given in Table-I with same parameters. The values of BSA, LBW and IBW for male subjects had been higher than female volunteers (Table II).

These results are comparable with the report of WHO[6]. The report revealed that females are suffering more as compared to males. The reasons for these differences were that the male people have more heights than females. So that over all values for BSA and BMI in males was higher than females. The correlation between BSA and IBW, LBW and BMI has been shown in Fig-1 for female volunteers. From the value of regression coefficient it has been clear that there was a significant positive correlation between BSA and LBW (R^2 = 0.996).

Table-I. Comparison of demographic/anthropmetric data in healthy adult male and female volunteers belonging to middle income group

Parameters	Units	Females				Males			
		Mean	± SD	Min	Max	Mean	± SD	Min	Max
Age	Year	21.80	1.10	20.00	24.00	22.33	1.69	19.00	26.00
Weight	kg	50.83	6.47	40.00	65.00	64.27	7.81	50.00	86.00
Height	cm	62.17	2.44	57.00	67.00	69.13	2.22	65.00	73.00
Blood Pressure	systolic	111.6	8.34	90.00	130.0	115.3	8.19	100.0	140.0
Blood Pressure	diastolic	73.33	6.74	60.00	80.00	77.83	7.39	70.00	90.00
Body Temperature	$^{\circ}$F	98.26	0.29	97.60	99.00	98.49	0.30	98.00	99.00
Body Surface Area	m^2	1.50	0.11	1.30	1.68	1.78	0.11	1.61	2.02
Ideal Body Weight	kg	1.50	0.11	1.30	1.68	1.78	0.10	1.61	2.02
Lean Body Weight	kg	50.48	5.60	39.60	61.60	71.01	5.12	61.50	79.90
Body Mass Index	kg/m^2	38.89	3.70	32.41	45.47	48.62	3.64	42.36	56.38

Table-II. Showing t- test table of the adult female and male volunteers participated in the study of serum lipid profile belonging to middle income group

Parameters	Females		Males		t-Stat
	Mean	± SD	Mean	± SD	
Triglycerides (mg/dl)	183.17	22.55	222.47	18.24	-2.08*
Cholesterol (mg/dl)	183.13	14.80	190.03	14.94	6.42**
High density lipo protein (mg/dl)	50.97	6.20	41.37	5.83	-2.33*
Low density lipo protein (mg/dl)	95.53	15.69	104.17	17.07	-5.52**
Total Lipids (mg/dl)	953.95	63.61	1037.95	58.78	-7.12**

** = Significant (p < o.o5)* *** = Highly significant (p <0.01)*

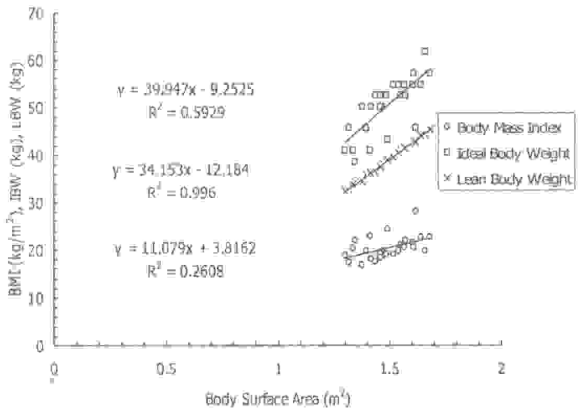

Fig-1. Showing correlation between BSA (m^2), BMI (kg/m^2), IBW (kg), and LBW (kg) of 30 healthy female volunteers who participated in the study of blood lipid profile

The value of regression coefficient between BSA and IBW showed a significant correlation (R^2 = 0.5929). The correlation between BSA and BMI did not show any significant relationship (R^2 = 0.2608). The correlation between BSA and IBW, LBW and BMI for male volunteers has been given in Fig-2. The correlation between BSA and LBW revealed a significant positive relationship (R^2=0.9674), between BSA and BMI showed a significant relationship (R^2 = 0.3816), whereas between BSA and IBW did not show any correlation (R^2=0.1861).

The values obtained for triglycerides, cholesterol, HDL, LDL and total lipid are given in Table III for both female and male volunteers.

The value for triglycerides for male volunteers was slightly higher than female volunteers, whereas overall value of triglycerides for both female and male volunteers was higher than the normal value. The reason of the difference between normal value and the values obtained was that mostly volunteers females or males were habitual of taking fat rich meal and some were smokers in case of male volunteers. The differences in the standard of living, level of education, level of involvement in physical activities and exposure to variable level of stress in life were also reflected in change of lipid profile of a person[7].

Increased level of education has been considered as helpful indicator to decrease atherogenicity as reported by Xnox. Exposure to physical stress leads to increased levels of cholesterol and triglycerides[8]. Value of cholesterol had been higher than the normal value for both male and female volunteers. This deviation from normal value was observed due to dietary, genetic and environmentally factors.

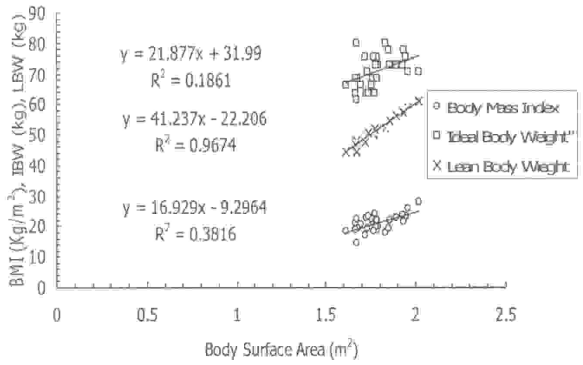

Fig-2. Showing correlation between BSA (m^2), BMI (kg/m^2), IBW (kg), and LBW (kg) of 30 healthy male volunteers who participated in the study of blood lipid profile

Most of the volunteers used to eat more junk food. A study conducted by number of Cholesterol Awareness Society of Pakistan in 1989 showed that 75% of adult female had higher blood cholesterol levels than the recommended levels. Influence of consumption of functional oil rich in phyto-sterols and medium chain triglycerides oil improves plasma lipid profiles in 24 healthy overweight men. Results showed that total cholesterol concentration decreased 12.5% when subjects consumed a diet rich in functional oil[9].

The values of LDL and HDL for male and female volunteers lied with in normal range whereas value for total lipids was slightly higher than normal values, which was attributed due to some striking family history dietary habits and cholesterol levels etc. The correlation between total lipids and triglycerides, cholesterol, HDL and LDL has been shown in Fig-3 for female volunteers, which showed a significant positive correlation between total lipid and triglycerides (R^2=0.5921) and between lipids and cholesterol (R^2=0.397). Whereas correlation between total lipids and other two parameters had not shown any relationship i.e. R^2=0.1573 and R^2=0.1404 for HDL and LDL respectively.

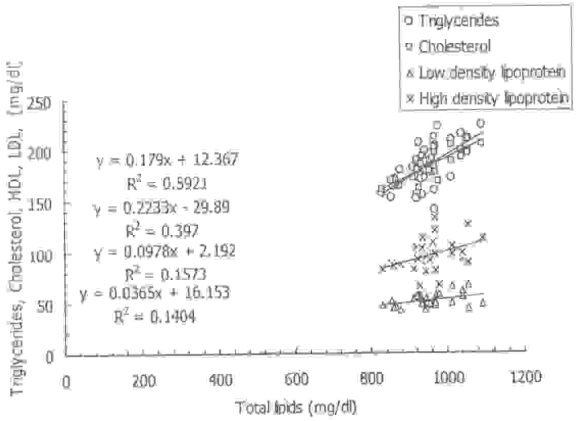

Fig-3. Showing correlation between total lipids (mg/dl), Triglycerides, Cholesterol, HDL and LDL (mg/dl) of 30 healthy male volunteers who participated in the study of blood lipid profile

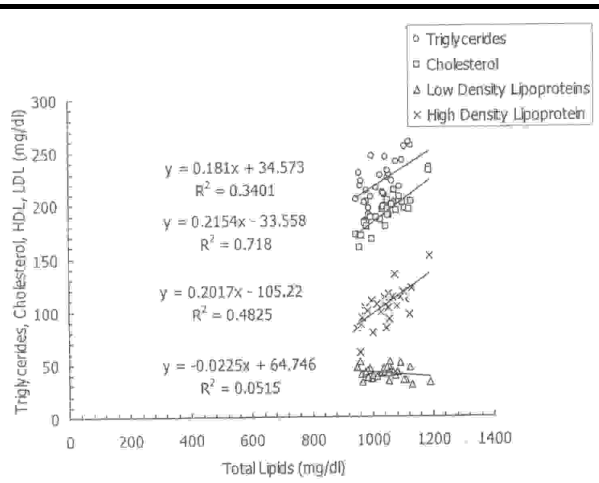

Fig-4. Showing correlation between total lipids (mg/dl), Triglycerides, Cholesterol, HDL and LDL (mg/dl) of 30 health male volunteers who participated in the study of blood lipid profile

In Fig-4 correlation between total lipids and triglycerides, cholesterol, HDL and LDL has given for male volunteer from the value of regression coefficient (R^2=0.718) it has been clearly shown

that there was a significant correlation between total lipids and cholesterol. The value of regression coefficient had showed a non-significant correlation between total lipids and triglycerides (R^2=0.3401). Regression coefficient value between lipids and HDL and LDL were R^2= 0.4825 and R^2=0.0515 respectively which showed a positive correlation for total lipids and HDL and a non-significant relationship for total lipids and LDL.

CONCLUSION

Dietary cholesterol and saturated fatty acids have been implicated in the etiology of cardiovascular disease which is present in large quantities in margarine, shortenings, fast foods and many common bakery products made from partially hydrogenated vegetable oils. The use of such foods high in saturated fatty acids should be cut down to lower the high level of cholesterol. Increase use of polyunsaturated fatty acids. Common vegetable oil such as canola and soybean oil are good sources of polyunsaturated fatty acids. Marine fish and eggs also contain substantial amounts of polyunsaturated fatty acids. Weight loss by a regular exercise also helps in keeping HDL-cholesterol high.

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