

Study Determination of Serum lipid and Apo lipoprotein Profile in the Reference Values in Comparison with the Nutritional Situation Girl Elementary students Khomeinishahr Township

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Abstract: This study aimed to determine the level of lipids and Apo lipoproteins serums in primary schools girls in Khomeinishahr Township to see which students already and maybe in future are exposed to blood pressure increase, heart and vascular diseases. So one hundred students randomly were selected and while fasting the blood samples were taken from them, the personal information forms and company consent form in research and a 24 recall questionnaire for three days were given to student`s parents to fill out. The questionnaires were analyzed by using convert coefficients table and percent of edible food. Levels of total cholesterol, HDLC, TG serum by enzyme method and levels of APOAI and APOB100apolipoproteins serums by immune turbidometry were measured and by reference levels and nutritional status were compared. The results showed that there was not any significant difference between the mean of total cholesterol and mean of APOAI. There was a significant difference between APOB100-HDLC-TG with reference mean values and was higher than reference value. There was not any significant difference between carbohydrates, fiber and fats from food with studied variables.

Keywords: Students, lipids, proteins, apolipoproteins, cholesterol, Triglycerides

1. Introduction

Cardiovascular diseases are the problem of twentieth century and probably will be the most serious problem in twenty-first century. Excessive changes in lipids, lipoproteins and Apo lipoproteins serums can be considered as a powerful risk for cardiovascular diseases. In this regard the increase in LDLc and decrease in HDLc have well-known effect and are used as criteria for treatment (Reardon et al, 1985)

Some apolipo proteins act as activators (co-factor) of involved enzymes in lipoproteins metabolism and some others also have the role of ligand for lipoprotein receptors on the level of cell (Rahmani et al, 2002). By simultaneous measurement of lipids, lipoproteins and Apo lipoproteins, the researchers will be able to acquire information about the shape, size and number of particles as well as to quantify the lipoproteins. So each drug or dietary factor that causes to changes in the level of Apo

lipoproteins of serums can be effective in causing or preventing from cardiovascular diseases. While recently the deaths from cardiovascular diseases have declined, the biggest cause of premature death all in the whole world is cardiovascular diseases. The evidences show that there is a relationship between that level of lipids and apolipoproteins serum in childhood and cardiovascular diseases in adolescent. In particular, the high value of LDLC and body weight gain was the most concerned of families. (Derman et al, 1996). The most important nutritional strategies for prevention of cardiovascular diseases including reducing in consumption of saturated fatty acids less than ten percent of the energy required per day (low-fat diet) and reducing in the food cholesterol intake(Zimmerman et al, 1986).

The research purpose

Determining the health indicators (serum fats) and comparing them with reference values and nutritional status of students.

The Research hypothesis

There is a difference between the values of total cholesterol, AOPB100, APOAI, HDLC, LDLC, TG in elementary girl students compare to different reference values.

There is a correlation between intake fats from food and lipids, lipoproteins and Apo lipoproteins serum

Cholesterol

It is a crucial and vital composition for body and in addition to having a structural role in cell walls is a raw material for producing vitamin D, steroid hormones as well as bile salts. All of the body cells have the ability to produce cholesterol. Liver as a primary producer of cholesterol in natural conditions produces 5 X 10¹⁶ cholesterol molecules per second.

Triglycerides

Three fatty acid molecules make an ester bond with three hydroxyl groups of glycerol molecule and three water molecules is released. So the created mixture, triglyceride is molecule, neutralized, non-polar and insoluble in water and easily can be saved as an energy source in adipose cells (Rifai et al, 1999).

Lipoproteins

Food fats or produced lipids in liver are insoluble in water and serum: then these materials must be carried with proteins. A complex of protein and lipid, is called lipoprotein: each lipoprotein has been produced with minimum of 4 particles :Triglycerides + protein + cholesterol + phospholipids that have a spherical polar structure and the exterior part including polar compounds like proteins (Apo lipoproteins), cholesterol free (non-esterified cholesterol) and phospholipids, The central part including non-polar compounds like esterified

cholesterol and triglycerides (Srinivasan et al, 2001).

Type of study

This study was cross sectional, descriptive and analytic. For collecting the data, interview, observation and experimental method were performed.

The population

The population for this study was girl elementary school students from Khomeinishahr Township in all grades (first to fifth) from 10 different schools.

Sample population

The sample population in this study was the students who were selected randomly and their parent participated in oriented courses and completed a written consent and personal information form. Because the total number of students was 8843, performing this project on all of them was not possible so we decided to determine the sample size till these selected samples (100 people) be generalized to the entire population. For probability of leaving the project, 20 additional samples were considered.

Inclusion criteria

Inclusion criteria including: willingness toward cooperation, age 7-12 years, no history of chronic diseases

Sampling method

At first, the total number of girl elementary school students from Khomeinishahr Township who were 8843 were selected and divided to 10 clusters, each including 884 individuals, as we have 100 samples that should be selected from 10 clusters or schools, so from each cluster or school 10 individuals were selected. Then by using a table of random numbers a three digit number between zero to 844 that is the distance of cluster will be selected. This three digit number was randomly assigned 499 as a starting point. The first school will be selected then the cluster distance (844) will be added to it. Second school will be selected and then again this

distance will be added to it. The third school will be selected and so on. After selecting 10 schools it is time for selecting the individuals. Again, by using the table of random numbers, the two numbers 14 and 22 randomly based on each base will be selected.

For sampling and blood test, if these individuals were not available, the next number from them will be used. By using cumulative sum, the students as 10 individual sets were determined systematically.

Measurement of Apo lipoproteins

Immunoturbidimetry: turbidity causes to reduction in the intensity of light while passing through a liquid. This intensity of reduction has different reasons including refraction-reflection and absorption. Measurement of decrease in the light intensity because of the effect of passing

through the solution is called turbidimetry (Wang et al 1989).

In this study A1 and B100 lipoproteins in the wavelength of 580 and 340 nm by using a standard curve and immunoturbidimetry method were measured (Jarvik et al, 1993).

Statistical methods

The method of information data analysis was descriptive and calculation of mean and standard deviation and confidence interval is 95 % and T test was used for comparing the mean with reference values. In this study 05/0P< was meaningful.

Characteristics of study subjects

Table 1: personal characteristic, height, weight, age and BMI were measured

	Min	Max	Mean	Standard error	Standard deviation
Age	6.00	11.00	8.70	0.15	1.46
BMI	10.50	25.10	16.56	0.29	2.93
Weight	16.00	58.00	30.35	0.86	8.56
Height	118.00	160.00	134.24	0.96	9.63

Serum lipids profile

Determination of total cholesterol level, TG, HDLC, LDLC, APOAI and APOB100 : in this

research minimum/maximum/mean and standard deviation of standard error for each indicators of Total, TG, HDLC, LDLC, APOAI and APOB100 was calculated.

Table 2: determination of total cholesterol, TG, HDLC, LDL, APOAI and APOB100

The variables	Error rate	Standard deviation	Mean	Maximum	Minimum
Chol	3.1	31.4	166.2	226.9	100.00
TG	37.5	37.5	37.5	92.50	246.00
HDLC	9.6	9.6	55.42	78.00	31.00
LDL	22.8	22.8	92.71	150.0	48.00
APOAI	22.9	22.9	131.8	228.0	90.00
APOB100	158.1	133.00	86.38	15.1	158.1

For comparing with the reference data (36), correlation coefficient and its test (T-test)

comparison of means with constant and calculation of descriptive indicators were used.

Table 3: test of comparing mean with reference data

Serum fat	mean	Standard error	Reference values	P-Value
Chol	166.2	31.4	164	0.402
TG	92.5	37.52	57	0.0001
HDLC	55.4	9.60	52	0.001
LDL	92.7	22.86	98	0.023
APOAI	131.8	22.91	135	0.162
APOB100	86.3	15.19	81	0.001

Discussion:

There was not any significant difference between total cholesterol mean and reference values mean in students and total cholesterol was normal, this is because the high cholesterol of serum is in relation with the risk of cardiovascular diseases and the food source is rich with egg cholesterol. (Each egg including 250 mg cholesterol) is recommended for the hyper lipid individuals who have limitation in consuming foods with cholesterol.

The measured TG values in individual's bloods were higher than source value that is probably because of simple carbohydrates (sugar and cube sugar). If more than 55 % of energy be supplied from carbohydrates causes to increase blood TG. On the other hand consuming carbohydrates is associated with developing obesity and ultimately increase in TG. The results are concordant with other studies (Ibrahim et al, 2001).

LDLC mean was lower than the average reference. Because of stated reasons in our study, the participants of this study were in a semi-rural area with a lot of physical activities that increase in sport and body activities decreases LDLC and on the other hand these individuals were from middle class families that consumption of vegetable proteins was more than consumption of animal proteins. These two factors have caused the LDLC value decrease but consumption of MUFA and PUFA fats in these individuals was high that this matter decreased LDLC and using complex carbohydrates instead of SFA fats caused to

decrease in LDLC. Considering this matter that increase in SFA causes to increase in LDLC, the SFA mean should not be lower than 10 % of total calories. On the other hand consumption of unsaturated fats (sunflower oil and seafood (salmon) decrease the amount of LDLC.

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