Dyslipidemia in Young Adults Aged (20-40) Years Attending Baghdad Teaching Hospital and Al-Mansour Primary Health Care Center in Baghdad City

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ABSTRACT:

BACKGROUND:

Hyperlipidemia is a condition characterized by high quantities of lipids in the blood stream. Lipids include cholesterol, triglycerides and phospholipids. Fats and cholesterol are generally processed in the liver and carried on proteins in the blood, forming lipoproteins. Its complications include pancreatitis, atherosclerosis, coronary artery diseases and stroke.

OBJECTIVE:

Is to estimate the prevalence of hyperlipidemia in the Iraqi young adults aged 20-40 years and to shed a light on any significant association between some socio-demographic and life style variables with hyperlipidemia.

SUBJECTS & METHODS :

A cross-sectional study was conducted from the first of December 2011 to the first of June 2012.

RESULTS :

The prevalence rate of any lipid abnormality (at least one abnormality) was 75%.The prevalence rates of elevated serum total cholesterol, low serum high density lipoprotein cholesterol, elevated serum triglyceride and elevated serum low density lipoprotein cholesterol were (32.5%, 38.5%, 29.5%, 30%), respectively. The prevalence rate of elevated TC/HDL ratio was 61%.

CONCLUSION :

There is a high prevalence of lipid abnormality in young adults of whom males had higher prevalence than females but the difference was not significant.The significant associated risk factors with hyperlipidemia were age, BMI, newly diagnosed or uncontrolled diabetic and hypertensive patients, cholesterol/fat rich diet and type of cooking oil.

KEYWORDS : hyperlipidemia ,risk factors ,life style variables , young adults.

INTRODUCTION:

The term hyperlipidemia signifies high lipid or fat content in the blood, including cholesterol, triglycerides, phospholipids, or other fats in the bloodstream. It is also called hyperlipoproteinemia because these fatty substances travel in the blood attached to proteins[1].

Hyperlipidemia may be caused by genetic factors, as in certain familial diseases. It may also be caused by secondary factors like certain dietary influences, especially in *acquired hyperlipidemia.* The health implications of this state are related to an increased risk of atherosclerosis, and by extension, heart disease and stroke [2].The world Health Report (2002) shows that almost one fifth (18%) of global stroke events (mostly nonfatal events) and about 56% of global heart disease are attributable to the high cholesterol levels. This amounts to about 4.4 million deaths (7.9% of the total) and 2.8% of the global disease burden [3].

People with high total cholesterol have approximately twice the risk of heart disease as people with optimal levels [4]. A desirable level is lower than 200 mg/dL [5]. Elevated triglycerides are now considered an independent risk factor for coronary heart disease and continue to be a major risk for acute pancreatitis, especially when levels exceed 1000 mg/dl[6]. Elevated triglycerides are a component of atherogenic dyslipidemia and often signal the presence of other conditions (eg, metabolic syndrome, type 2 diabetes mellitus) associated with an increased cardiovascular risk [7].

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Non-optimal levels of LDL (>100mg/dl) and HDL (<40mg/dl) cholesterol during young adulthood are independently associated with coronary atherosclerosis two decades later(8) .Detection and treatment of lipid disorders are keys to the prevention and management of clinical outcomes of chronic non-transmissible diseases [9].Starting at age 20, adults should have both total cholesterol and HDL checked every five years. If hyperlipidemia is discovered, a complete work-up should be done to assess the situation [10].

The United States Preventive Services Task Force (USPSTF) report recommends that men aged 20 to 35 years and women aged 20 to 45 years should be screened for hyperlipidemia if they have other risk factors for heart disease like smoking, diabetes, family history of heart disease or high blood pressure [11].

The most important risk factor for coronary artery disease is an elevated LDL and the second most important risk factor is depressed HDL[12].

AIMS OF THE STUDY:

1- To estimate the prevalence of hyperlipidemia among young adult individuals aged 20 – 40 years attending Baghdad teaching hospital and Al-Mansour primary health care center

2- To assess the association between some socio-demographic and life style variables with hyperlipidemia.

PATIENTS & METHODS:

Study Design: A cross sectional study was carried out in Baghdad Teaching Hospital and Al-Mansour Primary Health Care Centre in Baghdad city. The study was conducted from the first of December 2011 to the first of June 2012..

The study sample included (200) subjects comprising (112) females 56% and (88) males 44%. The study population included all young adults aged (20-40) years male and female individuals who attended the selected PHCC of family medicine and Baghdad Teaching Hospital for any complaint depending on the following criteria:

Inclusion criteria:

1- Age between 20-40 years of both genders.

2-From Baghdad city.

3- Fasting for 9-12 hours.

4- Patients diagnosed with hyperlipidemia were included in the study.

Exclusion criteria:

1- Pregnant women .

2-Patients with liver diseases.

Data Collection:

The subjects included in the study were interviewed according to the questionnaire form that includes questions about certain socio-demographic variables (age, gender, occupation, marital status and educational level), history of chronic diseases for the patient and his family (DM, hypertension, IHD, stroke, and hyperlipidemia), history of intake of medications (steroids, contraceptive pills, B-blockers, diuretics), social history including (physical activity, smoking, drinking alcohol and type of cooking oil) [13]Anthropometric Measures: * Weight was measured with subjects in light clothes without shoes. Weight was recorded to the nearest 0.5 kg.

* Height was measured with a tape. Subjects were requested to stand upright without shoes with their back against the wall, heels together and eyes directed forward.

* Body Mass Index: BMI is calculated as *BMI = Weight (kg) / Square Height (m^2).*

BMI was classified as underweight (below 18.5 kg/m^2), normal range (18.5-24.9 kg/m^2), overweight (25-29.9 kg/m^2), class I obesity (30-34.9kg/m^2), class II obesity (35-39.9 kg/m^2) and class III obesity (>40 kg/m^2) [14].Blood Pressure Measurement:The study sample was assessed using standard criteria formulated by the US Seventh Joint committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure . Hypertension was diagnosed if there was a prior diagnosis by a physician, current use of blood pressure lowering medications, or measured blood pressure values of $\geq$ 140 mmHg systolic or $\geq$ 90 mmHg diastolic on $\geq$ 2 occasions [15].Measurement of fasting lipid profile and fasting blood sugar:Blood sample was drawn from an antecubital vein in all subjects after 9-12 hours fasting. Low-density lipoprotein (LDL) cholesterol was calculated according to the Friedewald formula: *LDL cholesterol = TC – (TG/5 + HDL cholesterol)* [16].

Hypertriglyceridemia was defined as a fasting plasma concentration $\geq$ 150 mg/dl. Hypercholesterolemia was defined as a total cholesterol $\geq$200 mg/dl. Hypoalphalipoproteinemia was considered present if HDL-cholesterol was < 40 mg/dl, LDL cholesterol is considered elevated if the values$\geq$ 130 mg/dl and TC/HDL ratio is considered elevated if the value > 4.These cut points were selected based on National Cholesterol Education

Program recommendations . Risk score was calculated by assigning a score of one unit to each risk factor associated with hyperlipidemia. Exceptions were allowed for the dose of smoking and cholesterol / fat rich diet. Non-smokers were assigned a score of zero, mild and Ex-smoker was assigned a score of one, moderate to heavy smoking was assigned a score of 2. Positive, but less frequent cholesterol / fat rich diet was assigned a score of 1, while a daily rich fat diet was assigned a score of 2. The total score was a summation of the score obtained on all the factors for each studied subject. A higher risk score may indicate an increase in the load of factors favoring hyperlipidemia [17].Diabetes was diagnosed if there was a previous medical diagnosis or in the presence of two readings of a fasting plasma glucose value > 126 mg/dl and no previous history of diabetes [18].

Statistical Analysis: Statistical analyses were done using SPSS version 20 computer software (Statistical Package for Social Sciences).

RESULTS:

The total sample studied were (200), the age of them ranged between 20-40 years, 112 (56%) were females and 88 (44%) were males.

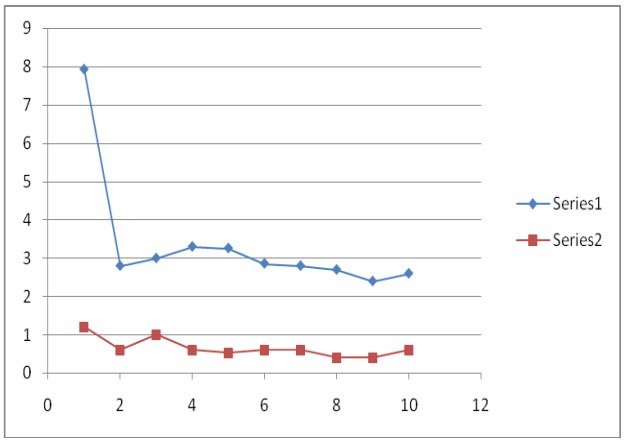
The distribution of the study subjects according to the socio-demographic variables are presented in table 1. 143 (71.5%)of them are non-smokers, 7 (3.5%)are ex-smokers and 50 (25%) are smokers . Those who are physically active for 30 min./day for 5-7 days/week were 124 (62%)and poor physical activity for 8(4%)of them. 67 (33.5%) of them consume cholesterol rich diet daily .46 (23%)of them use plant oil only(table2).

The prevalence rate of hypercholesterolemia was 32.5% (CI: 26%-39%), of low serum HDL cholesterol was 38.5% (CI: 31.8%-45.2%), of hypertriglyceridemia was 29.5% (CI: 23.2%-35.8%), of elevated serum LDL was 30% (CI:23.6%-36.4%), of elevated TC/HDL ratio was 61% (CI: 54.2%-67.8%), and that of any lipid abnormality (at least one abnormality) was 75% (CI: 69%-81%) as illustrated in fig.(1).

The serum TC In the overall sample ranged between (88 – 290) mg/dl with a mean of 181.7 ± 39.5 mg/dl (± SD), serum HDL cholesterol ranged between (25 – 65) mg/dl with a mean of 42.1 ± 7.7 mg/dl, serum TG ranged between(37 – 366) mg/dl with a mean of 131.2 ± 59.8 mg/dl, serum LDL cholesterol ranged between (14.4 - 220.4) mg/dl with a mean of 113.5 ± 35.6 mg/dl and TC/HDL ratio ranged between (1.8- 10) with a mean of 4.4 ± 1.2. The frequency distributions for the above–mentioned parameters of the blood lipid profile are illustrated in Table (4) . There was a positive (direct) linear correlation between the age ,BMI ,risk scores, Cholesterol/fat rich diet and serum TC, TG, LDL and TC/HDL ratio which was statistically significant ,a negative significant correlation between educational level and TC/HDL ratio (p=0.012) .

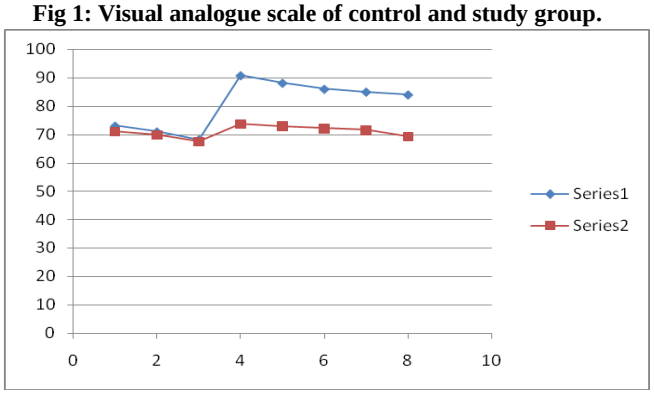
There was a negative significant correlation between the BMI , risk factors , cholesterol rich diet and serum level of HDL cholesterol p=0.006 , 0.014 , 0.013 respectively . There was a positive significant correlation between the smoking index and serum level of TG and TC/HDL ratio p=0.002 ,0.008 respectively; (table 5).

The percentage of any lipid abnormality was significantly higher among older age group (79.6%) compared to younger age group(62.3%) (p=0.013) The obese participants in the study sample had a higher rate of lipid abnormality (96.2%) as compared to the overweight (81.3%) and acceptable (41.2%) in which the differences were statistically significant (p<0.001) table (6).The lipid abnormality was higher in Newly diagnosed or uncontrolled diabetic , newly diagnosed or uncontrolled hypertensive and the difference was significant statistically (p=0.049, 0.036 respectively. A higher rate of lipid abnormality are found in those having a frequent cholesterol or fat rich diet (95.5%) which is higher than those who are not having such a diet (54.4%) and the difference was statistically significant (p<0.001). Regarding the type of cooking oil, there was a higher rate of lipid abnormality in those using a mixed type (81.2%) which is higher than those using plant oil only and the difference was statistically significant (p<0.001). Regarding the risk score, those who are have 5 risk factors or more had a higher rate of lipid abnormality (92.5%) which is higher than those having less or no risk factors and the difference was statistically significant (p=0.001).Table (7)Only BMI had a statistically significant association with the risk of having any lipid abnormality (p=0 .001) Table (8).



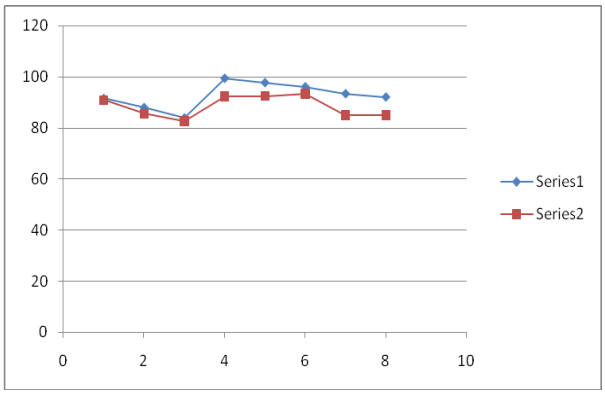
Series 1 Control group	30 min after recover	1hr	2hr	3hr	4hr	5hr	6hr	12hr	18hr	24hr
	1	2	3	4	5	6	7	8	9	10
	7.93	2.8	3	3.3	3.26	2.86	2.8	2.7	2.4	2.6
series 2 study group	30 min after recover	1hr	2hr	3hr	4hr	5hr	6hr	12hr	18hr	24hr
	1	2	3	4	5	6	7	8	9	10
	1.2	0.6	1	0.6	0.53	0.6	0.6	0.4	0.4	0.6

Fig 1: Visual analogue scale of control and study group.



Series 1 Control group	Before induction	5 min after induction	20 min after induction	Immediate Post O.P	6hr post O.P	12hr post O.P	18hr post O.P	24hr post O.P
	1	2	3	4	5	6	7	8
	73	70.93	68.13	90.8	88.13	86	85	84
series 2 study group	Before induction	5 min after induction	20 min after induction	Immediate Post O.P	6hr post O.P	12hr post O.P	18hr post O.P	24hr post O.P
	1	2	3	4	5	6	7	8
	71	69.8	67.53	73.66	72.93	72.13	71.53	69.3

Fig 2: Heat rate (beat/min) of the control and study group.



Series 1 Control group	Before induction	5 min after induction	20 min after induction	Immediate Post O.P	6hr post O.P	12hr post O.P	18hr post O.P	24hr post O.P
	1	2	3	4	5	6	7	8
	91.4	87.9	83.8	99.3	97.6	96	93.3	92
series 2 study group	Before induction	5 min after induction	20 min after induction	Immediate Post O.P	6hr post O.P	12hr post O.P	18hr post O.P	24hr post O.P
	1	2	3	4	5	6	7	8
	90.8	85.46	82.6	92.2	92.33	93.3	85	85

Fig 3: Mean arterial blood pressure (mmHg) of the control and study group.

Table 1:Comparison of VSA in both Groups.Postoperative.

Group II.

30 min after recover	1hr	2hr	3hr	4hr	5hr	6hr	12hr	18hr	24hr
Mean 0.6	0.73	0.86	0.86	0.86	0.86	0.86	1.53	1.55	1.26
± S.D	0.2	0.26	0.26	0.26	0.26	0.26	0.6	0.6	0.33
T1 21.63*	22.3*	12.7*	11.5*	8.3*	7.8*	7.3*	6.9*	6*	5.5*

Group I

30 min after recover	1hr	2hr	3hr	4hr	5hr	6hr	12hr	18hr	24hr
Mean 1.93	2.8	3	3.3	3.26	2.86	2.8	2.7	2.4	2.6
± S.D 1.2	0.6	1	0.6	0.53	0.6	0.6	0.4	0.4	0.6

DISCUSSION:

There has been a recent concern about chronic NCDs in Iraq. The country is undergoing an epidemiological transition with an increasing burden of chronic non communicable diseases (19). MOH statistics from hospital based data and routinely collected information show that cardiovascular diseases represent the main causes of hospital admission and account for around 40% of all causes of death in the country [(20)]. Dyslipidemia is one of the important risk factors for CHD. Assessment of the prevalence rate for selected indices of dyslipidemia is an important step towards designing a primary prevention program for CHD and CVA.

The current study is step one forward in the assessment of dyslipidemia in Baghdad. It

provides an exceptional opportunity to study the greater part of all indices of blood lipid profile in a narrow age spectrum (20 to 40 years of age).

In the current study the crude measure of hyperlipidemia was total serum cholesterol; its prevalence was 32.5% (95% confidence interval 26 to 39%). This estimate was comparable to that reported in a survey was carried out on a nationally representative sample of adults by MOH in Iraq in 2006 in a similar age group (28.9%) [21]. Sawant et al, [22] reported a comparable estimate (30.5%) in the same age group of adults under 40 attending a health checkup program in Mumbai, India. The Turkish estimate of hypercholesterolemia in adults older than 20 years old was (37.5%) in 2008 was also comparable to the current study[23] . Other studies reported lower estimates. Batieha et al.[24] reported a prevalence rate as low as 23% in Jordan. The Ministry of Health and Population in Egypt, 2005, reported an estimated prevalence rate of hypercholesterolemia as low as 19.4%[25] .

In conclusion the mean serum blood lipids were either slightly lower or comparable to that of Indian [22] and Mexican[26] studies. The HDL and TC/HDL ratio was in particular better in the Turkish study [23] This may be explained by genetics, life styles and dietary habits.

Socio-demographic variables and selected risk factors were tested for the association with one summary outcome variable namely presence of any lipid abnormality. Among the socio-demographic variables, only older age and overweight-obesity were associated with a statistically significant higher rate of any lipid abnormality.

A risk score is a summary measure to show the importance of these risk factors in addition to those that had an observed but not statistically significant association with the risk of having any lipid abnormality.

In univariate analysis, the risk score had statistically significant positive association with lipid abnormality. After adjusting for gender, age and BMI.The risk score was positively associated with the risk of having any lipid abnormality. Its impact was however smaller in magnitude and not significant statistically in multivariate analysis. Obesity was the single most important and strongest variable in predicting any lipid abnormality. Obese subject had an increase risk of 38.4 times compared to those with acceptable BMI while being an overweight increase the risk by 7.7 times. In comparison the highest risk group (those with a risk score of 5 and more) increase the risk of hyperlipdemia by 2.5 times only compared to those with zero risk score.

The current study showed that high serum glucose is also positively associated with dyslipidemia. The Mexican study show that diabetes was associated with increased TG and increased LDL cholesterol[26]. A similar finding was reported by the Jordanian study[24] . The Turkish study showed a link between dyslipidemia and increase serum blood sugar [23].

Being a male is risky for dyslipidemia as shown in the current study in which the males had higher prevalence of hyperlipidemia than females. Many published articles reported this finding. Like in Turkey[23] , India [22], Mexico[26] and Saudi Arabia [27].

Indeed, gonadal hormones are directly involved in both glucose and lipid metabolism, with decreased level of estrogen and /or higher level of testosterone being associated with insulin resistance and a proatherogenic lipid profile, which makes the male gender by itself a risk factor for cardiovascular disease [28].

The current study showed that getting older in age is associated with an increase risk of hyperlipidemia. This fact is well established and reported in many publications [22,26,23,24,25,29,27].

the most important risk factor for dyslipidemia in the current study is obesity. Plenty published articles reported and studied this fact in depth like Indian study, Turkish study, Jordanian, Egyptian and Mexican studies [22,26,23,24,25]).This can be explained as obesity is one of the major secondary causes of hyperlipidemia [30] and both of them are components of the metabolic syndrome according to NCEP-ATP III [18]

CONCLUSION:

1. This study revealed the high prevalence of hyperlipidemia in young adults individuals aged between (20-40) years old. The prevalence of any lipid abnormality was (75%) in which the low serum HDL was the most common lipid abnormality with a prevalence rate of (38.5%) followed by elevated TC (32.5%), elevated serum LDL (30%) and elevated serum TG (29.5%). Male subjects had a higher prevalence of lipid abnormality but the difference was not significant.
2. Significant associated risk factors with hyperlipidemia were age, BMI, newly diagnosed or uncontrolled diabetic and hypertensive patients, cholesterol/fat rich diet and type of cooking oil .

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