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RESEARCH ARTICLE

Dyslipidemia among Apparently Healthy Adults in Baghdad, Iraq

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Abstract

Introduction Circulating lipids and lipoproteins are long being recognized as risk factors for developing cardiovascular diseases (CVD). Objective To evaluate the prevalence and profiles of dyslipidemia in apparently healthy (AH) and asymptomatic subjects. Method In this cross sectional study we had randomly selected 217 AH individuals of the both the genders that were of 18- 69 years of age and disease free. Individuals having history of any medications for diabetes, hypertension and CVD were excluded from the study. The remaining healthy individuals underwent detained physical examinations and tests of lipid profiles. Results In the overall population, the prevalence of high density lipoproteins HDL (64.5%) and very low density lipoproteins VLDL (13.8%) were most common lipid abnormalities found. Conclusion Thus it is concluded that the AH subjects is highly susceptible to develop dyslipidemia and HDL-C abnormalities and this information could be used to design the preventive polices for future CVD events and seriously may affect the choice of AH subjects as control group in clinical researches .

Keywords: *Apparently healthy subjects, Lipid profile, Dyslipidemia.*

Introduction

The measurement of lipid profile has long been documented as essential for the diagnosis and clinical management of dyslipidemia. It is of basic facts that dyslipidemia is one of the major cases of serious illnesses**.** Hyperlipidemia including hypertriglyceridemia, has been revealed to be an independent risk factor for major cardiac event (1,2). Defining a healthy subject is not easy, in this condition; diverse criteria underlying the concept of wellness can be implied.

The Royal College of Physicians has defined the healthy volunteer as an "individual who is not known to suffer any significant illness relevant to the suggested study, who should be within the normal range of body measurements, like weight. In addition, the mental state of healthy volunteers, is such that he is able to understand and give valid consent to the study" Royal College of Physicians (1986) (3). The EMEA guideline also proposes a general definition of healthy volunteer for studies aimed at assessing pharmacokinetics: healthy, adult volunteers, in well-defined and controlled conditions" (4).

On this basis, the selection of healthy volunteers is conducted by enrolling subjects without relevant pathologies and with organ functions, such as heart, liver and kidney, in the normal range. However, the general definitions of healthy volunteer, as proposed by current guidelines, allow wide margins of discretion. A control group included individuals similar to the trial group in all features that affect the results except for the (treatment/intervention) of interest. On the basis of comparability to the target persons or the persons at risk, controls are carefully selected. This group is critical to determine a treatment or intervention, also aiding in the assessment of efficacy and safety. A control group distinguishes results produced by the treatment or intervention of interest from those caused by other factors, for example normal course of disease (5).

In designing a clinical trial, the choice of control group is always a serious decision, because the choice affects the inferences which can be produce from the trial (6). Lipids play an important role in maintaining the cell membrane integrity. Lipid profile is a panel of blood tests that serve as an initial medical screening for abnormalities in lipids and approximate risk for cancer, cardiovascular diseases, pancreatitis, etc (7).

Dyslipidemias are abnormal amounts of lipid and/or lipoprotein in the blood that may be

related to other diseases, with obesity being the most common, which is typically associated with a combined dyslipidaemia pattern with mild elevation in total cholesterol (TC) and low-density lipoprotein cholesterol (LDL), moderate to severe elevation in triglycerides (TG), and low high-density lipoprotein cholesterol (HDL) (8–10).

Objectives

To evaluate the prevalence and profiles of dyslipidemia in apparently healthy (AH) and asymptomatic subjects**.**

Materials and Method

This cross-sectional study was conducted at Collage of health and medical technology/ Baghdad betweenJanuary2017 and March 2017. The enrolled population comprised different area of Baghdad the reference individuals were identified and included as apparently healthy normal control (AHNC) subjects. All the participants were identified and included based on strict inclusion and exclusion criteria. Participants who met the following criteria were finally included in the investigated group (Adults: age between 18 and 70 years, Participants considered AHNC by their respective doctors).

On the other hand participants with any of the following were excluded from the study group; Participants with known pathologic states, diabetes mellitus, kidney disease, hypertension, cardiac disease, anemia, thyroid gland disorders, liver diseases, fever, current intake of pharmacologically active substances, usage of drugs, vitamins, oral contraceptive pills, past illness of typhoid, tuberculosis, within 6 months of the study date and jaundice or major surgery, modifiable physiological state like pregnancy, lactating women, and blood pressure (BP) higher than140/90 mm of Hg, psychological and mental disorders such as severe stress and depression. After 12 hour fasting, blood samples of the subjects were obtained from antecubital vein between 8 and 11a.m.

The samples were centrifuged within 3 hours in medical city Hospital' steaching laboratory unit at 3000 rpm for 3 minutes. The serum was then collected and stored at – 30 degrees over six months. Then the lipid profile including the levels of total serum cholesterol (TC), low density lipoprotein cholesterol (LDL), high density lipoprotein cholesterol (HDL), very low density lipoprotein (VLDL) and triglyceride (TG) were measured for all subjects in private. Serums TC, HDL, TG were assayed by enzymatic methods (colorimetry) using kit CHOD (REF 1500010). LDL and VLDL values were calculated using the standard formula TC-HDL-TG/5, TG/5 respectively. Normal range of serum TG 40 mg/dl, serum LDL.

Statistical analysis

Data were translated into a computerized database and then was examined for errors using range and logical data cleaning methods, and inconsistencies were identified and corrected. Statistical analyses were done using IBMSPSS version 23 computer software (IBM Statistical Package for Social Sciences) in association with Microsoft Excel.

Results

The range of normal values was identified from literature review and used in identifying study subjects that had a test value out of the reported normal range (whether abnormally high or low) of test values. This definition of normal value is based on the assumption that an individual is exposed to a single test only; hence we used the term isolated test abnormality.

As shown in figure (1.1) and table (1-1`) the most frequently reported test abnormality in the blood lipid profile test domain (comprised of five tests in the current study) among AHI was for serum high density lipoprotein (HDL) test (64.5% with abnormally low level of this protective type of blood cholesterol) and the least frequent was for serum very low density lipoprotein (VLDL) test (13.8%).

Table 1: Prevalence rate of isolated single test abnormalities in a random sample of apparently healthy controls

	Abnormally high/low (N=217)	N	%
	Blood Lipids profile domain		
	Serum HDL (mg/dl)	140	64.5
	Serum LDL (mg/dl)	65	30.0
	Serum TG (mg/dl)	31	14.3
	Serum Total Cholesterol (mg/dl)	31	14.3
	Serum VLDL (mg/dl)	30	13.8

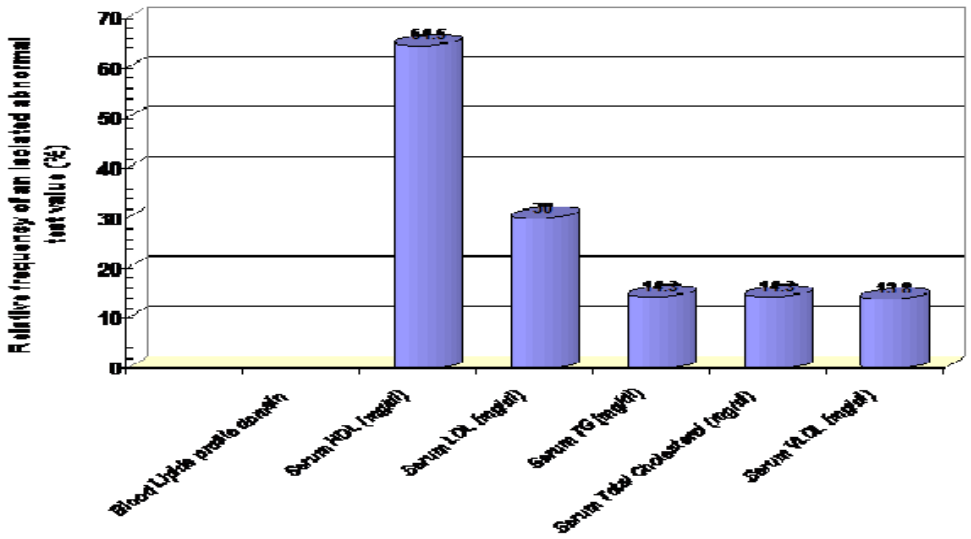

Figure 1: Bar chart showing the prevalence rate of isolated blood lipids profile test abnormalities in a random sample of apparently healthy controls (N=217)

As shown in table 1-2, the count of abnormal test values that belongs to a specific test domain was studied. The prevalence rate of apparently healthy individuals with a completely normal lipid profile (composed of 5 test components) was 25.3%, while that with at least two abnormal test components was 34.1%.

Table 2: The relative frequency of abnormal test components in each test domain

		N	%	Cumulative %
1.	Count of abnormal lipid parameters (5)			
	5	8	3.7	3.7
	4	4	1.8	5.5
	3	29	13.4	18.9
	2	33	15.2	34.1
	1	88	40.6	74.7
	0	55	25.3	100
	Total	217	100	

Discussion

Wellbeing of an individual is conceptually different in different countries, in the same country at different times and in same individuals at different ages. It is thus a relative and rather than absolute state. Therefore the condition of individuals must be related to reference data (11).

In respect to lipid profile domains and as it is illustrated in Figure (1.1), Table (1-1) dyslipidemia appeared to be highly prevalent in apparently healthy Iraqi peoples with subnormal levels of HDL ranking first as it was recorded in 64.5% of participants. In comparison with the other alarming studies it is still higher than all of them for example in Jordanian adults (12) found such abnormality (43.6%), 38.5 % in Iraqi young adults(13)41.5%in Turkish adults(14), 36.53% in apparently healthy adult Gujarati population (15) % 44.2 among the adult Population of Ahvaz (16) and 44.1% in healthy Bangladeshi adults (17). The data from the current study revealed that the situation is even get worsen in comparison with previous study in Iraq which showed that dyslipidemia of low HDL-C was 49.9 %(18). Such disappointed finding can be attributed to unhealthy dietary habits depending on foods deficient with HDL-C and to stressful and sedentary lifestyle.

Low HDL-C may be a surrogate marker of poor overall metabolic health including increased levels of oxidative stress (OS), inflammation, insulin resistance (IR), sedentary lifestyle (or poor physical activity), alcohol consumption and smoking. Shahnam and his co-workers showed that the ratio of high stress in people with low HDL-C was 1.12 times higher compared to normal individuals, i.e. individuals with low HDL-C

had higher levels of stress compared to normal individuals (19).

Dyslipidemia involves those individuals who have faulty life style *i.e.* poor physical activity which were significantly linked with some types of dyslipidemia, in addition to increased consumption of fatty foods, smoking, atherosclerosis, diabetes and hypertension that starts at an early age in these individuals (20, 21).

Main causes of low HDL are Type 2 Diabetes (T2D) and abdominal obesity, the worldwide incidences of which are increasing at alarming rates particularly in Middle East (ME) region. Lipid abnormalities are generally related with cardiovascular disorders which again linked to subclinical inflammation. Siddique *et al*., reported that low HDL-C is related to chronic subclinical inflammatory events (22).

This may possibly posing increased risk in the development of cardiovascular diseases (CVD). The prevalence rate of dyslipidemia varies widely according to the socioeconomic, ethnicity, and cultural characteristics of distinct population groups (14), also dyslipidemia significantly related to age and BMI. High prevalence of low HDL-C in Iraqi AH subjects may be linked with major health problems. In this respect, Vílchez et al., 2015 mentioned that several epidemiological studies have reported a correlation between low levels of HDL-C and higher cancer risk, in different types of cancers (23).

VLDL a component of non-high-density lipoprotein cholesterol is identified as a risk factor for atherosclerotic cardiovascular disease (ASCVD) (24, 25, 26).

The statistical analysis in the current study stated that the prevalence of VLDL among Iraqi AH subjects was 13.8%, which is again higher than prevalence that recorded in other studies for example the study of (15) who reported that prevalence of VLDL was 8.61% in apparently healthy adult Gujarati Population. Increased VLDL-C is a major form of dyslipidemia, especially in Asian population (China). Recent epidemiological studies proposed the superiority of VLDL-C over low-density lipoprotein cholesterol (LDL-C) in terms of the population-attributable risk proportion for ASCVD (24).

Zhao et al., 2017 study showed that very high levels of VLDL-C were independently associated with the increased risk of carotid atherosclerosis among asymptomatic individuals (27). In the same context (24, 28) reported that such elevation was significantly linked with elevated risk of coronary heart disease (CHD). The prevalence of dyslipidemia varies between different populations depending on geographic location, socioeconomic status and genetic factors (29).

Additionally; different diagnostic criteria are depended to define dyslipidemia, which can lead to marked variations in the prevalence of dyslipidemia reported in different studies (30). In conclusion: Prevalence of lipid profile abnormalities in AH subjects is higher. Variable prevalence rates are documented grounding on the cut off recommended by the ministry of health in Iraq. Early management of this serious medical problem is necessary to implement the suitable health management and prevent its related consequence.

References

1. Kannel WB, Vasan RS (2009) Triglycerides as vascular risk factors: new epidemiologic insights for current opinion in cardiology. Current opinion in cardiology, 24(4):345
2. Eberly LE, Stamler J, Neaton JD (2003) Relation of triglyceride levels, fasting and no fasting, to fatal and nonfatal coronary heart disease. Archives of internal medicine, 163(9):1077-1083.
3. Royal College of Physicians (1986) Research on healthy volunteers. J R Coll Physicians 20:243–257
4. EMEA (2004) Position paper on non-clinical safety studies to support clinical trials with a single microdose. CPMP/SWP/2599/ 02/Rev 1. http://www.ema.europa.eu/pdfs/human/swp/259902en . pdf. Accessed 23 March 2010
5. Malay S, Chung KC (2012) the choice of controls for providing validity and evidence in clinical research. Plastic and reconstructive surgery, 130(4):959.
6. Nahler G, Nahler G (2009) Committee for Proprietary Medicinal Products (CPMP). Dictionary of Pharmaceutical Medicine, 32-32.
7. Reddy AV, Killampalli LK, Prakash AR, Naag S, Sreenath G, Biraggari SK (2016) Analysis of lipid profile in cancer patients, smokers, and nonsmokers. Dental research journal, 13(6):494.

8. Reiner Ž, Catapano AL, De Backer G, Graham I, Taskinen MR, Wiklund O, Agewall S, Alegria E, Chapman MJ, Durrington P, Erdine S (2011) ESC/EAS Guidelines for the management of dyslipidaemias: the Task Force for the management of dyslipidaemias of the European Society of Cardiology (ESC) and the European Atherosclerosis Society (EAS). European heart journal, 32(14):1769-1818.
9. Peterson AL, McBride PE (2012) A reviews of guidelines for dyslipidemia in children and adolescents. Age, 20(8).
10. FOR Epoig, Children, RRI (2011) Expert panel on integrated guidelines for cardiovascular health and risk reduction in children and adolescents: summary report. Pediatrics, 128(Suppl 5):S213.
11. Goyal G, Panag KS (2016) Establishing Reference Value of Biochemical Parameters: A Must before Ensuring Quality in Biochemistry Diagnostic Lab. Annals of Pathology and Laboratory Medicine, 3(3):A212-216.
12. Khader YS, Batieha A, El-Khateeb M, Al Omari M, Ajlouni K (2010) Prevalence of dyslipidemia and its associated factors among Jordanian adults. Journal of clinical lipidology, 4(1):53-58.
13. Al-Sabah HA, Hussain NH, Ali DT (2014) Dyslipidemia in Young Adults Aged (20-40) Years Attending Baghdad Teaching Hospital and Al-Mansour Primary Health Care Center in Baghdad City. The Iraqi Postgraduate Medical Journal, 13:320-327.
14. Bayram F, Kocer D, Gundogan K, Kaya A, Demir O, Coskun R, Sabuncu T, Karaman A, Cesur M, Rizzo M, Toth PP (2014) Prevalence of dyslipidemia and associated risk factors in Turkish adults. Journal of clinical lipidology, 8(2):206-216.
15. Sahoo SS, Madan T, Sharma KH, Jain SR, Shah KH, Kandre YA (2015) Prevalence and Profiles of Dyslipidemia in Apparently Healthy Adult Gujarati Population. Age, 28:5-62.
16. Latifi SM, Moradi L, Shahbazian H, Aleali AM (2016) A studies of the prevalence of dyslipidemia among the adult population of Ahvaz, Iran. Diabetes & Metabolic Syndrome: Clinical Research & Reviews, 10(4):190-193.
17. Saiedullah M, Sha MFR, Siddique, MAH, Tamannaa Z, Hassan Z (2017) Healthy Bangladeshi individuals having lower high-density lipoprotein cholesterol level compared to age-, gender-, and body mass index-matched Japanese individuals: A pilot study. Journal of Molecular Path physiology, 6(1):1-4.
18. Mula-Abed WAS, Chilmeran SK (2007) Prevalence of dyslipidemia in the Iraqi adult population.Saudi medical journal, 28(12):1868-1874.
19. Shahnam M, Roohafza H, Sadeghi M, Bahonar A, Sarrafzadegan N (2010) The correlation between lipid profile and stress levels in Central iran: isfahan healthy heart program. ARYA atherosclerosis, 6(3):102.
20. Noeman A, Ahmad N, Azhar M (2007) Coronary artery disease in young: Faulty life style or heredofamilial or both. Annals of King Edward Medical University, 13(2).
21. Al-Kaabba AF, Al-Hamdan NA, El Tahir A, Abdalla AM, Saeed AA, Hamza MA (2012) Prevalence and correlates of dyslipidemia among adults in Saudi Arabia: results from a national survey. Open Journal of Endocrine and Metabolic Diseases, 2(04):89.
22. Siddique MAH, Saiedullah M, Rahman M, Ali L, Islam MA (2016) chronic subclinical inflammation in middle aged Bangladeshi population: association with low high-density lipoprotein cholesterol. J Mol Pathophysiol, 5(4):73.
23. Vílchez JA, Vílchez JA, Vílchez JA, Vílchez JA, Vílchez JA, Vílchez JA, Vílchez JA (2015) Could Low Hdl-Cholesterol Levels Be an Unvalued Predictor of Cancer Risk? A Retrospective Case Study. International Journal of Clinical Medicine, 6(12).
24. Ren J, Grundy SM, Liu J, Wang W, Wang M, Sun J, Liu J, Li Y, Wu Z, Zhao D (2010) Long-term coronary heart disease risk associated with very-low-density lipoprotein cholesterol in Chinese: the results of a 15-Year Chinese Multi-Provincial Cohort Study (CMCS). Atherosclerosis, 211(1):327-332.
25. Varbo A, Benn M, Tybjærg-Hansen A, Jørgensen AB, Frikke-Schmidt R, Nordestgaard BG (2013) Remnant cholesterol as a causal risk factor for ischemic heart disease. Journal of the American College of Cardiology, 61(4):427-436.
26. Prenner SB, Mulvey CK, Ferguson JF, Rickels MR, Bhatt AB, Reilly MP (2014) Very low density lipoprotein cholesterol associates with coronary artery calcification in type 2 diabetes beyond circulating levels of triglycerides. Atherosclerosis, 236(2):244-250
27. Zhao F, Qi Y, Liu J, Wang W, Xie W, Sun J, Liu J, Hao Y, Wang M, Li Y, Zhao D(2017) Low Very low-Density Lipoprotein Cholesterol but High Very low-Density Lipoprotein Receptor mRNA Expression in Peripheral White Blood Cells: An At herogenic Phenotype for At herosclerosisina Community-Based Population. E Bio Medicine, 25:136-142.
28. Liu J, Sempos CT, Donahue RP, Dorn J, Trevisan M, Grundy SM (2006) Non–high-density lipoprotein and very-low-density lipoprotein cholesterol and their risk predictive values in coronary heart disease. The American journal of cardiology, 98(10):1363-1368.
29. Zhang L, Qiao Q, Dong Y (2012) Ethnic Difference in Lipid Profiles. In Dyslipidemia-From Prevention to Treatment. In Tech.
30. Tomeleri CM, Ronque ER, Silva DR, Júnior CGC, Fernandes, RA, Teixeira DC, Barbosa DS, Venturini D, Okino AM, Oliveira JA, Cyrino ES (2015) Prevalence of dyslipidemia in adolescents: Comparison between definitions. Revista Portuguesa de Cardiologia (English Edition), 34(2):103-109.

