Relationship between Drugs, Diabetes Mellitus and Hypertension with Obesity in Sera of Women after Menopause

Suhad Abdlaziz Abrahem
Department of Chemistry, College of Science, Al-Nahrain University, Al-Jaderia, Baghdad-Iraq.

Abstract

The Study aims to estimate serum levels of glucose, cholesterol, triglyceride and HDL in thirty postmenopausal who take Diabetes medicine only or with hypertension medicines. The study also includes twenty postmenopausal who not take any medicine as control group. Relationship of BMT, BSA, LBW and IBW was carried out with glucose and lipid profile in studied groups. Results showed that there were significant higher values of the LBW and IBW also there were significant increase in the level of cholesterol, LDL, VLDL and total lipidlevels with ($P<0.01$) in compared to control groups.

Keywords: Obesity, glucose, cholesterol, triglyceride, HDL cholesterol, LDL cholesterol.

Introduction

The discovery that the high-density-lipoprotein (HDL) in a coronary heart disease (CHD) anti-risk factor has modified the lipid theory of atherogenesis. At the present time it can be stated that high coronary risk is associated with high levels of cholesterol-rich low–density-lipoprotein (LDL) and its triglyceride-rich precursor, the very–low–density lipoprotein (VLDL), and with a low level of HDL-cholesterol [1].Antihypertensive treatment has proved to be effective in preventing so-called pressure-related hypertensive complications. Such as stroke and renal failure, the antihypertensive drugs have not unequivocally shown a preventive effect on the incidence of coronary heart disease (CHD).This fact may have many causes, e.g the time factor, and other co-operative risk variables for the development of CHD. One possible contributing factor may also be the unfavorable, metabolic effects of some Antihypertensive drugs, recently, the effect on lipid metabolism of hypertension t herapy has been highlighted [2].Obesity is a chronic condition with increased body fat due to a complication in appetite and energy metabolism. It is defined as a body mass index (BMI) which is equal to or more than 25. It is one of themodifiable risk factors of type 2 diabetes because it carries risks for the health, diabetes, high blood pressure, gall bladder disease and some cancers [3]. BMI less than 18.5 is considered Underweight and may indicate malnutrition, an eating disorder, or other health problems [4]. A BMI greater than 25 is considered overweight. Above 30 is considered Slight Obesity, while Over 40 is considered High Obesity and needs a medical constant follow-up. Obesity has been found to be the most prevalent nutritional disorder in prosperous and even underdeveloped countries [5]. It increases the risk of developing several diseases, partly through mechanical effect of the mass of extra tissues on the functions of various organs.

Materials and Methods

Fifty fasting menopause women aged between (45-76) years were sampled their height, weight. Body Mass Index (BMI), Lean body weight (LBW)and Ideal body weight (IBW) were calculated by using their height (m) and weight (kg). On the basis of BMI, by using DuBois and DuBois2 formulae on the basis of LBW and IBW, while glucose, cholesterol, triglyceride, HDL-cholesterol measured by using enzymatic methods. Random of 5ml blood samples had been obtained from the arm vein of each subject and immediately transferred to laboratory separated by centrifuging at 4000 rpm for 10 min. The supernatant (serum) was processed for different parameters.

Anthropometrical Measurements

Body Surface Area (BSA),Body Mass Index(BMI),Lean Body Weight (LBW) and Ideal body Weight(IBW) had been calculated by using DuBois and DuBois2 formulae:

BSA=0.20247*Height(m)0.725*
Weight(Kg)0.425

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

LBW(women)=(1.07*weight(kg))-
148(weight2)*(100*height(m^2))
IBW (women) = 45.5+2.3 (Height(m)-60)

Analytical Procedure

Serum samples had been analyzed for glucose, and for total cholesterol, triglycerides and HDL while LDL was calculated by using the friedwald formula[8]. cholesterol in serum had been analyzed by using kit from (BIOLABO REAGENTS/made in France/No.AT80106)triglyceride in serum were analyzed by using kit from (BIOLABO REAGENTS/made in France / No.AT80019), systems and partly as consequence of changes in metabolism [6]. And HDL in serum had been determination by using kit from (BIOLABO REAGENTS /made in France / No.AT80017). Total lipids (TL) for serum were determined from total cholesterol (TC), and triglycerides (TG) using the equation:
TL= 2.27 (TC) + TG +.623 (Bernert et al., 2007; Phillips et al., 1989).

Statistical Analysis

The significance of difference between the groups was tested using the t-test analysis, and the results of blood glucose, lipid profile, BMI had been presented as mean ± SD and correlation between parameters had been examined by using Microsoft excel and SPSS software 14.0version.

Results and Discussion

This study had been conducted to compare demographic data of both groups postmenopausal women volunteers, as given in Table (1) with same parameters. The values of BSA, LBW and IBW for study groups had been higher than control groups volunteers. These results are comparable with the report of WHO[7]**.** The report revealed that females take medicine Atenolol, Capoten in the treatment of hypertension (atenolol is a drug belonging to the group of beta blockers and its chemical works by slowing down the heart and reducing its workload it was the main β-blocker identified as carrying a higher risk of provoking type 2 diabetes[8]**,** while Captopril is an angiotensin-converting enzyme inhibitor (ACE inhibitor). These types of females suffering more as compared to females not take any drugs. The reasons for these differences may be to the effect of taking medicine compared to those not take any drugs. therefore the increasing shown in all values for BSA and BMI for study groups was higher than control groups.

Table (1)

Comparison of demographic/anthropometric data in study and control postmenopausal women.

parameters	*Units*	*Study(n=30)*		*Control(n=20)*	
		mean	*±SD*	*mean*	*±SD*
Age (year)	Year	56.92	12.41	50.72	9.80
Weight (kg)	Kg	86.42	21.14	71.27	22.94
Height (M)	cm	164.78	7.92	161.45	5.10
Body surface Area (BSA)	M^2	2.00	0.26	1.76	0.24
Ideal body weight (IBW)	Kg	69.14	8.19	57.52	7.42
Lean body weight (LBW)	Kg	57.25	5.16	56.39	2.16
Body mass index (BMI)	Kg/m^2	32.17	9.14	27.44	9.27

The risk of hypertension increases progressively with higher levels of body weight or BMI and parallels the degree of obesity. The association between BMI and blood pressure consistently has been shown in numerous studies[9]. Numerous studies

consistently have documented that for those who are already overweight, weight loss significantly reduces blood pressure and the incidence of subsequent hypertension. Large, randomized trials of weight reduction in adults with hypertension have shown significant reductions in blood pressure in response to weight loss [10].Studies suggest that polyunsaturated fatty acid increases the plasma levels of leptin, which, in turn would facilitate the reductions of weight [11]. The values obtained for triglycerides, cholesterol, HDL, LDL and total lipid are given in Table (2) for both study and control groups postmenopausal women volunteers.

Table (2)
The t-test of the postmenopausal women volunteers participated in the study of serum glucose and lipid profile.

parameters	*Study(n=30)*		*Control(n=20)*		*p-value*
	mean	*±SD*	*mean*	*±SD*	
Glucose(mg/dl)	138.85	82.83	102.30	30.73	0.089
Triglyceride(mg/dl)	193.78	45.45	159.31	51.16	0.094
Cholesterol(mg/dl)	215.21	33.32	160.36	53.73	<0.01**
HDL (mg/dl)	54.07	7.16	51.45	11.96	0.531
LDL (mg/dl)	126.42	23.52	77.08	43.63	<0.01**
VLDL (mg/dl)	39.85	8.92	30.37	10.75	<0.01**
Total lipids(mg/dl)	682.945	103.308	523.96	146.77	<0.01**
BMI(kg/m^2)	32.17	9.14	27.44	9.27	0.108
BSA(m^2)	2.00	0.26	1.76	0.24	<0.05*
LBW(kg)	57.25	5.16	56.39	2.16	0.306
IBW(kg)	69.14	8.19	57.52	7.42	<0.01**
*** =Significant(P<0.05) **=Highly significant (P <0. 01)**					

The value for glucose, triglyceride and cholesterol for study groups postmenopausal women volunteers was slightly higher than control groups postmenopausal women volunteers, hypertension and glycemic control are very important determinants of cardiovascular outcome in obese diabetic hypertensive patients, weight reduction, physical exercise, and a combination of antihypertensive and insulin sensitizers agents are strongly recommended to achieve target blood pressure and glucose levels [12], both diuretics and β-blockers accelerate the appearance of new-onset type 2 diabetes mellitus in patients with hypertension. Therefore, the risk of new-onset diabetes-associated cardiovascular risks should be factored into future treatment recommendations for patients who require antihypertensive therapy.

The values of LDL and HDL for study groups higher than control groups which was attributed due to some striking family history habits and cholesterol levels etc. The correlation between BMI and sugar, cholesterol, triglycerid. HDL and LDL has been shown in Fig.(1) for study groups postmenopausal women volunteers, which showed a significant negative correlation between BMI and sugar (r=-0.4030)whereas correlation between BMI and other parameters had not shown any relationship. In Fig.(2) Correlation between BMI and sugar, triglycerides has given for control groups postmenopausal women volunteers from the value of correlation coefficient (r =0.726), (r= 0.556) it has been clearly shown that there was a significant correlation between BMI and sugar, triglyceride. The value of correlation coefficient had showed anon-significant correlation between BMI and cholesterol (R=0.228). and HDL and LDL were (R=0.0523) and (R=0.135) respectively.

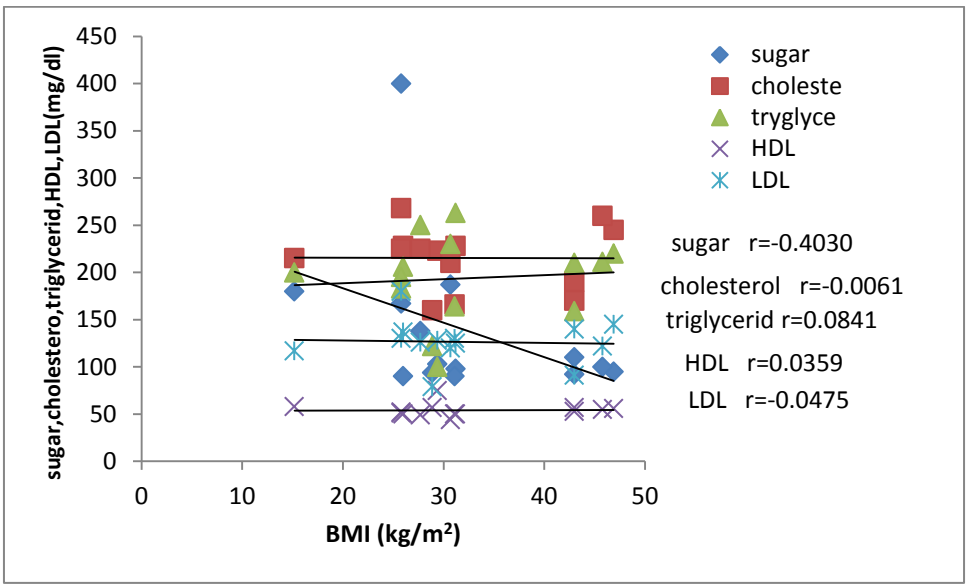

Fig.(1) Showing correlation between BMI (kg/m^2) with sugar, cholesterol, Triglycerides, HDL and LDL (mg/dl) of 30 female (study group).

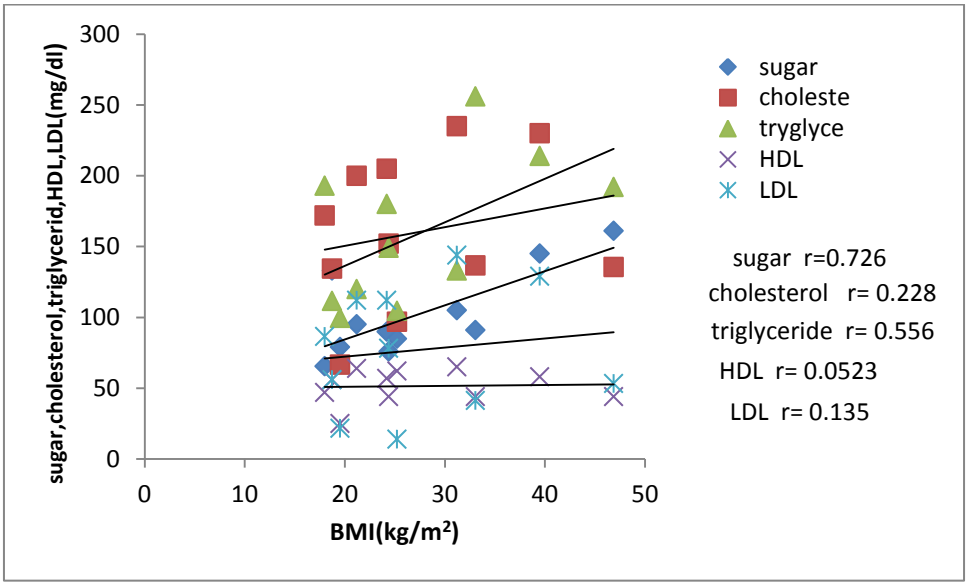

Fig.(2) The correlation between BMI (kg/m^2) sugar, Triglycerides, cholesterol, HDL and LDL (mg/dl) of 20 female (control group).

The mechanism by which obesity induces insulin resistance is poorly understood, but a number of mechanisms have been suspected to be involved [13]. Obesity causes peripheral resistance to insulin-mediated glucose uptake and may also decrease the sensitivity of the beta-cells to glucose. These changes are largely reversed by weight loss, leading to a fall in blood glucose concentrations towards normal levels. Weight gain precedes the onset of diabetes; conversely, weight loss is associated with a decreased risk of type 2 diabetes this study similar to the findings of Donahue [14], and prineas. The correlation between total lipid and BMI, BSA, IBW and LBW has been shown in Fig.(3) for 20 female (control group),which showed asignificant positive correlation between total lipid and BMI(r=0.688) and between lipid and BSA(r=0.468).Whereas correlation between total lipid and other two parameters had not shown any relationship i.e.(r=0.137),(r=0.318) for LBW, IBW respectively.

In Fig.(4) correlation between total lipid and BMI, BSA, IBW and LBW has given for 30 female (study group) from the value of

correlation coefficient (r=0.58) it has been clearly shown that there was a significant correlation between total lipid and BSA. The value of correlation coefficient had showed anon-significant correlation between total lipid and other parameters BMI, LBW, IBW (r=0.289), (r=0.188), (r=0.178) respectively. BMI was>30 in this study was 23% which is similar to the findings of Yekeen who found 33%, Okosunhad suggested that the prevalence of hypertension was closely linked to abdominal adiposity [15]. The percentage of subject who's however since waist-hip ratio was not measured in this study, it is difficult to confirm their observation with the findings of the present study.

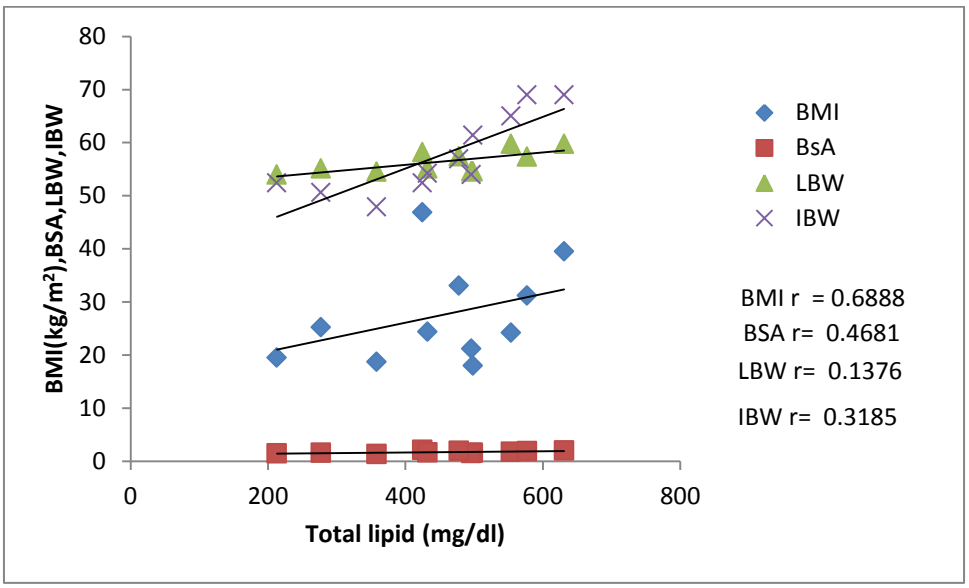

Fig.(3) The correlation between total lipid and BMI,BSA,IBW and LBW of 20 female (control group).

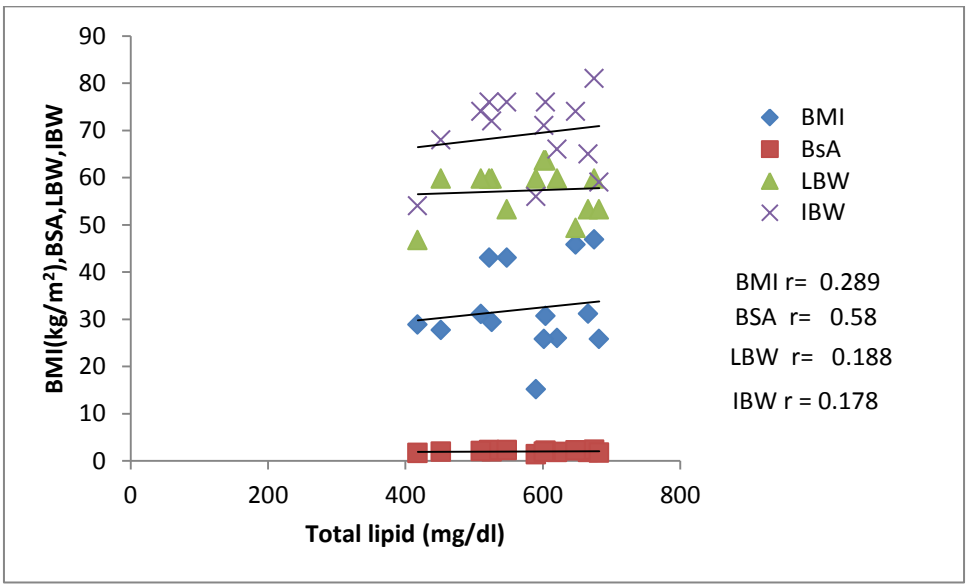

Fig.(4) The correlation between total lipid and BMI,BSA,IBW and LBW of 30 female (study group).

Conclusion

The study concluded that the effect of increase in the BMI cannot be lowered or deleted by using medicine of hypertension and/ or diabetes in obese post menopausal women.

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الخلاصة

هدفت الدراسة لتقييم مستويات (السكر والكولستيرول، الدهون الثلاثية والبروتينات الدهنية العالية الكثافة) في ثلاثين امرأة في سن الياس اللاتي يتناولن ادوية الضغط او السكر او كلاهما . كما تضمنت الدراسة عشرون امرأة في سن الياس اللاتي لايتناولن اي نوع من الادوية اعتبروا كمجموعة سيطرة، كما درست العلاقة بين كتلة الجسم والمساحة السطحية والوزن المثالي مع مستويات (الكوليستيرول،الدهون الثلاثية، البروتينات العالية الكثافة). اثبتت النتائج هنالك علاقة معنوية عالية ($P<0.01$) ,وجد ان هناك علاقه موجبة بين مؤشر كتلة الجسم و مستوى كل من الكلوكوز،الكوليستيرول، ومستوى اللايبوبروتين واطئ الكثافة فحين هناك علاقة موجبه مع الدهون الثلاثية ومستوى اللايبوبروتين عالي الكثافة.