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Correlation of body composition and lipid profile parameters in Postmenopausal women

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KEYWORDS

Cardiovascular disease, post menopause, body composition, lipid profile

A B S T R A C T

The interactions between the various physiological risk factors for cardiovascular disease are complex in women, the risk increases markedly after menopause and eventually becomes equivalent to that of men. This observation has suggested, but has not proven, that estrogens have a protective effect against cardiovascular disease.This study was done to find out correlation between body composition and lipid profile parameters in postmenopausal women of north-west Karnataka, the present study was conducted in the department of physiology, Al-ameen medical college, Bijapur. Sixty nine postmenopausal women attending the hospital were selected and divided into two groups. Group-I: 32 early postmenopausal women (up to 5 years of postmenopausal duration) Group-II: 37 late postmenopausal women (> 5 years of postmenopausal duration), then the body composition parameters were measured by classical anthropometry and skin fold calipers and lipid profile parameters were analyzed by enzymatic method. The statistical analysis was done by correlation analysis. The body composition parameters and lipid profile parameters were correlated in both Group-I (early postmenopausal women) and Group-II subjects (late postmenopausal women). No statistically significant correlation was found between most of the parameters in both the groups except for the weight(r =-0. 3600, p<0. 05) BSA(r =-0. 3555, p<0. 05), and FM(r =-0. 3946, p<0. 05) which were significantly correlated with HDL-C in Group –II subjects (late postmenopausal women).

Introduction

Cardiovascular disease is a leading cause of mortality in men and women in industrialized world. The interactions between the various physiological risk factors for cardiovascular disease are complex; the incidence of cardiovascular disease increases with age in both sexes, but in women the risk increases markedly after menopause and eventually becomes equivalent to that of men. This observation has suggested, but has not proven, that estrogens have a protective effect against cardiovascular disease.[1] Menopause is a natural event in the ageing process and

signifies the end of reproductive years with cessation of cyclic ovarian functions as manifested by cyclic menstruation. It is heralded by menopausal transition, a period when the endocrine, biological and clinical features of approaching menopause begins. The hormonal changes associated with menopause i.e. Low plasma levels of estrogen and marked increase in LH and FSH levels exerts a significant effect on plasma lipids and lipoproteins.[2]

In cross sectional study of 426 women of the virgilio menopause health project in a large cohort of middle aged women in pre, peri and postmenopausal women.TC and LDL-C correlated positively with BMI, W-H ratio and age, and negatively with free fatty mass and estradiol blood levels.[3]

The Fifty-four women (mean: 61.8 +/- 7.8 years old) showing hyperlipidemia and 63 controls were enrolled in this study. Their baseline characteristics and body-fat indices, as measured by DEXA, were compared. The correlations between the serum-lipid levels and the variables were evaluated. Amount of upper-half-body fat and the body-fat ratio were significantly higher in the hyperlipidemia group.

In single-regression analysis, there were low levels of correlation between the serum TC levels and the amount of upper-half-body fat and the upper-body fat ratio. There was a low level of correlation between the serum TG level and the amount of upper-half-body fat, the upper-lower-half-body-fat ratios, and the upper-half-body-fat ratio. After adjusting for variables, the serum TC and TG levels best correlated with the amount of upper-half-body-fat (r = 0.458, r = 457, respectively).[4]

There have been studies regarding the effect of menopause on body weight, fat distribution, total fat%, and also on lipid profile, but most of the studies are conducted on western population. As Indian population differs in body composition and lifestyle, this study was undertaken to evaluate the correlation of these parameters in early and late postmenopausal women of North West Karnataka.

Materials and Methods

The present study was conducted in the department of physiology, Al-Ameen medical college, Bijapur. Sixty nine postmenopausal women attending Al-Ameen medical college hospital, Bijapur were selected and divided into two groups.
Group-I: 32 Early postmenopausal women (up to 5years of postmenopausal duration).[4]
Group-II: 37 Late postmenopausal women (> 5years of postmenopausal duration).[4]

Inclusion criteria: all healthy postmenopausal women, who attained menopause by natural means.

Exclusion criteria: postmenopausal women who have undergone hysterectomy, diabetic, hypertensive, on hormone replacement therapy, lipid lowering drugs & with H/O Gynecological & hormonal disorders.

The study protocol was explained to the subjects, who volunteered for the study. Informed consent was obtained from each of the participant. A detailed history of subjects was taken. The physiological parameters pulse rate & blood pressure were recorded.

The height, weight, body surface area, body mass index, waist circumference, hip circumference, waist hip ratio were recorded by standard method. Body fat percentage was recorded by skin fold calipers[5].Fat mass was calculated by formula (FM=Wt/100XBF %) and expressed in

kg.fat free mass was calculated and expressed in kg by using the formula (FFM=Weight –fat mass).[7] Fat mass index was calculated from fat mass in (kg)/Height in (m^2)[7]. Muscle mass was calculated by using fat free mass (MM=50% of FFM).[6]

Lipid profile parameters: after overnight fasting, 2ml of venous blood sample was collected from each subject. Clear unhemolyzed serum was obtained by centrifuging blood at 3000rpm for 15 min, and lipid profile was done by semi-automated analyzer (Erba star 21 plus)using enzymatic method. Lipids analyzed were triglyceride, total-cholesterol, HDL-C, LDL-C, VLDL-C and TC/HDL, HDL/LDL were calculated.[8]

Results and Discussion

The body composition parameters and lipid profile parameters were correlated in both Group-I and Group-II subjects. No statistically significant correlation was found between most of the parameters in both the groups except for the weight(r =-0. 3600, p<0. 05) BSA(r =-0. 3555, p<0. 05), and FM(r =-0. 3946, p<0. 05) which were significantly correlated with HDL-C in Group –II subjects. The results are shown in table and graph.

The body composition and lipid profile parameters were correlated in both Group-I and Group-II subjects. No statistically significant correlation was found between most of the parameters in both the groups except for the weight(r =-0. 3600, p<0. 05) BSA(r =-0. 3555, p<0. 05), and FM(r =-0. 3946, p<0. 05) which were significantly correlated with HDL-C in Group-II subjects. This correlation may be due increased intra-abdominal adipose tissue (IAF), as it has high sensitivity to catecholamine induced lipolysis. Non esterified fatty acids mobilized from IAF into the portal circulation, may increase hepatic production of TG and ApoB lipoprotein, and increase subsequent export of VLDL particles. Increased VLDL-TG in turn depress circulating concentrations of HDL-C due to the action of cholesterol –ester transfer protein.[9] Further study with more sophisticated methods like dual x-ray absorptiometry, CT scan and MRI to measure body composition parameters may throw a better light in correlating body composition parameters with lipid profile parameters.

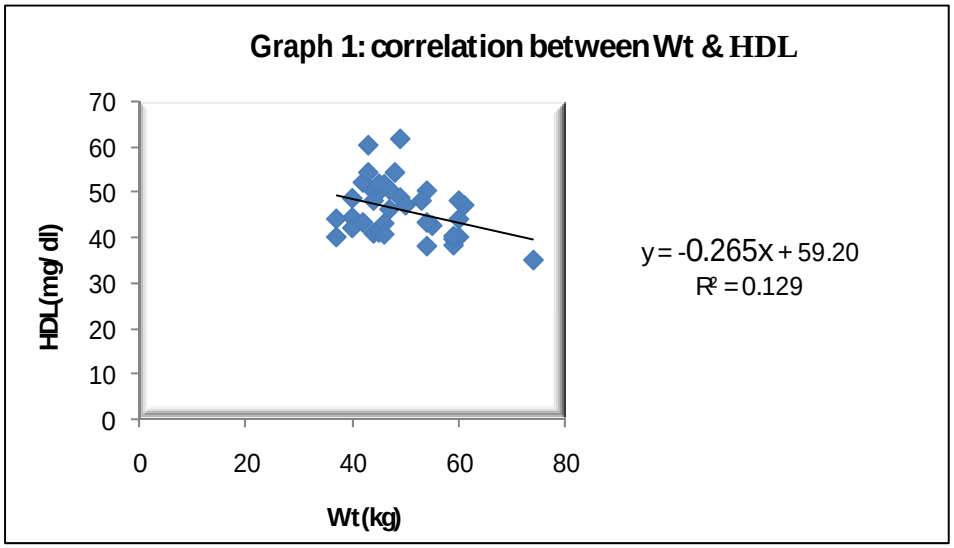


Table.1 The values of r t and p in correlation analysis of group-I & group-II subjects in this study

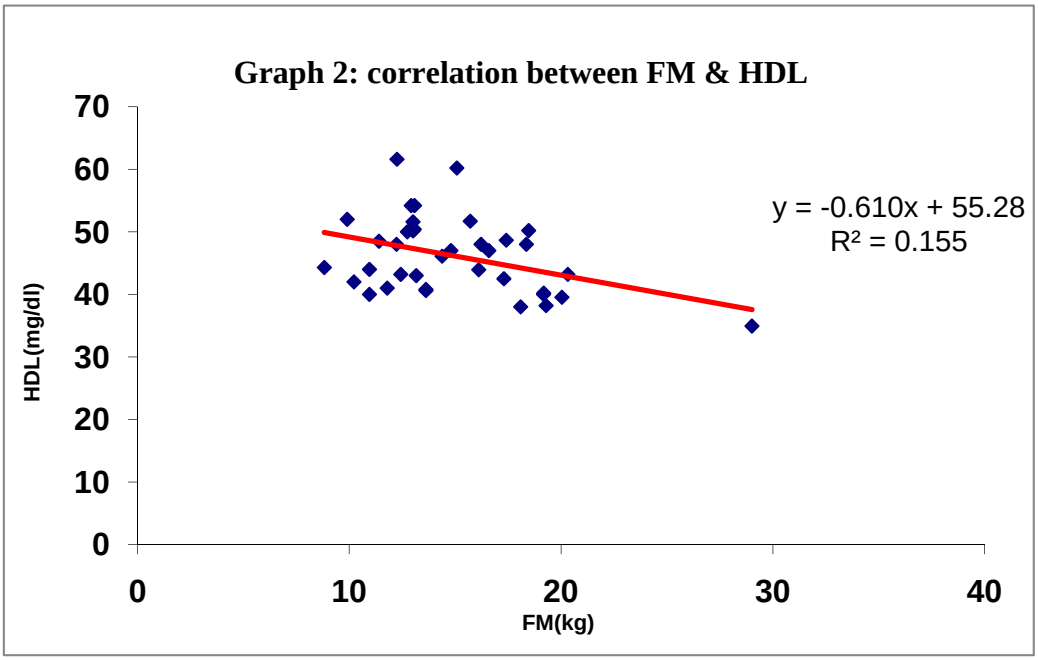
Sl.no	Parameter	Group-I(N=32)			Group-II(N=37)		
		R	p	S/NS	r	p	S/NS
1	Wt vs TC	-0.1539	>0.05	**NS**	-0.008	>0.05	**NS**
2	Wt vs TG	0.2179	>0.05	**NS**	0.1682	>0.05	**NS**
3	Wt vs HDL	-0.3148	>0.05	**NS**	-0.3600	<0.05	**S**
4	Wt vs LDL	-0.1726	>0.05	**NS**	0.0141	>0.05	**NS**
5	Wt vsVLDL	0.2261	>0.05	**NS**	0.1660	>0.05	**NS**
6	Wt vs TC/HDL	0.1594	>0.05	**NS**	0.2659	>0.05	**NS**
7	Wt vs HDL/LDL	0.0260	>0.05	**NS**	-0.1245	>0.05	**NS**
8	BMI vs TC	-0.0200	>0.05	**NS**	-0.0787	>0.05	**NS**
9	BMI vs TG	0.3089	>0.05	**NS**	-0.0030	>0.05	**NS**
10	BMI vs HDL	-0.3193	>0.05	**NS**	-0.1105	>0.05	**NS**
11	BMI vs LDL	-0.0728	>0.05	**NS**	-0.0557	>0.05	**NS**
12	BMI vsVLDL	0.3353	>0.05	**NS**	-0.0040	>0.05	**NS**
13	BMI vs TC/HDL	0.2771	>0.05	**NS**	0.0787	>0.05	**NS**
14	BMI vsHDL/LDL	-0.0608	>0.05	**NS**	0.0843	>0.05	**NS**
15	BSA vs TC	-0.2780	>0.05	**NS**	0.0583	>0.05	**NS**
16	BSA vs TG	0.0656	>0.05	**NS**	0.2291	>0.05	**NS**
17	BSA vs HDL	-0.2878	>0.05	**NS**	-0.3555	<0.05	**S**
18	BSA vs LDL	-0.2354	>0.05	**NS**	0.0616	>0.05	**NS**
19	BSA vsVLDL	0.0374	>0.05	**NS**	0.2269	>0.05	**NS**
20	BSA vs TC/HDL	0.0224	>0.05	**NS**	0.2625	>0.05	**NS**
21	BSA vsHDL/LDL	0.0735	>0.05	**NS**	-0.2175	>0.05	**NS**
22	WC vs TC	0.0173	>0.05	**NS**	0.0794	>0.05	**NS**
23	WC vs TG	0.2538	>0.05	**NS**	0.0938	>0.05	**NS**
24	WC vs HDL	-0.2433	>0.05	**NS**	-0.2218	>0.05	**NS**
25	WC vs LDL	-0.2450	>0.05	**NS**	0.0990	>0.05	**NS**
26	WCvsVLDL	0.2668	>0.05	**NS**	0.0920	>0.05	**NS**
27	WCvsTC/HDL	0.2546	>0.05	**NS**	0.2579	>0.05	**NS**
28	WC vs HDL/LDL	-0.0655	>0.05	**NS**	0.0800	>0.05	**NS**
29	HC vs TC	-0.1192	>0.05	**NS**	0.0447	>0.05	**NS**
30	HC vs TG	0.3025	>0.05	**NS**	0.1517	>0.05	**NS**
31	HC vs HDL	-0.2998	>0.05	**NS**	-0.2668	>0.05	**NS**
32	HC vs LDL	-0.1732	>0.05	**NS**	0.0566	>0.05	**NS**
33	HC vsVLDL	0.3203	>0.05	**NS**	0.1503	>0.05	**NS**
34	HC vs TC/HDL	0.2256	>0.05	**NS**	0.2454	>0.05	**NS**
35	HC vsHDL/LDL	0.0224	>0.05	**NS**	-0.0648	>0.05	**NS**
36	WHR vs TC	0.2720	>0.05	**NS**	0.0480	>0.05	**NS**

p>0.05: Not Significant, *p: <0.05: Significant,

Table.2 The values of r t and p in correlation analysis of group-I & group-II subjects in this study

Sl.no	Parameter	Group-I			Group-II		
		r	P	S/NS	r	p	S/NS
37	WHR vs TG	0.0007	>0.05	**NS**	0.0529	>0.05	**NS**
38	WHR vs HDL	0.1015	>0.05	**NS**	-0.0283	>0.05	**NS**
39	WHR vs LDL	0.2604	>0.05	**NS**	0.0678	>0.05	**NS**
40	WHR vsVLDL	-0.0014	>0.05	**NS**	-0.0539	>0.05	**NS**
41	WHRvsTC/HDL	0.1170	>0.05	**NS**	0.0883	>0.05	**NS**
42	WHRvsHDL/LDL	-0.1439	>0.05	**NS**	-0.0346	>0.05	**NS**
43	BF% vs TC	-0.0458	>0.05	**NS**	-0.1493	>0.05	**NS**
44	BF% vs TG	0.2500	>0.05	**NS**	0.1510	>0.05	**NS**
45	BF% vs HDL	-0.2746	>0.05	**NS**	-0.2457	>0.05	**NS**
46	BF% vs LDL	-0.0849	>0.05	**NS**	-0.1503	>0.05	**NS**
47	BF% vsVLDL	0.2691	>0.05	**NS**	0.1500	>0.05	**NS**
48	BF%vsTC/HDL	0.2532	>0.05	**NS**	0.0894	>0.05	**NS**
49	BF%vsHDL/LDL	-0.0447	>0.05	**NS**	0.0714	>0.05	**NS**
50	FM vs TC	-0.1382	>0.05	**NS**	-0.0883	>0.05	**NS**
51	FM vs TG	0.2202	>0.05	**NS**	0.1865	>0.05	**NS**
52	FM vs HDL	-0.2883	>0.05	**NS**	-0.3946	<0.05	**S**
53	FM vs LDL	-0.1667	>0.05	**NS**	-0.0678	>0.05	**NS**
54	FM vsVLDL	0.2343	>0.05	**NS**	0.1849	>0.05	**NS**
55	FM vsTC/HDL	0.1700	>0.05	**NS**	0.2415	>0.05	**NS**
56	FM vsHDL/LDL	0.0316	>0.05	**NS**	-0.0678	>0.05	**NS**
57	FFM vs TC	-0.1661	>0.05	**NS**	0.0566	>0.05	**NS**
58	FFM vs TG	0.1955	>0.05	**NS**	0.1323	>0.05	**NS**
59	FFM vs HDL	-0.3247	>0.05	**NS**	-0.2912	>0.05	**NS**
60	FFM vs LDL	-0.1703	>0.05	**NS**	0.0775	>0.05	**NS**
61	FFM vsVLDL	0.1957	>0.05	**NS**	0.1304	>0.05	**NS**
62	FFM vsTC/HDL	0.1315	>0.05	**NS**	0.2538	>0.05	**NS**
63	FFM vsHDL/LDL	0.0200	>0.05	**NS**	-0.1572	>0.05	**NS**
64	FMI vs TC	-0.0583	>0.05	**NS**	-0.1245	>0.05	**NS**
65	FMI vs TG	0.2731	>0.05	**NS**	0.0671	>0.05	**NS**
66	FMI vs HDL	-0.2961	>0.05	**NS**	-0.1944	>0.05	**NS**
67	FMI vs LDL	-0.1044	>0.05	**NS**	-0.1086	>0.05	**NS**
68	FMI vsVLDL	0.2955	>0.05	**NS**	0.0663	>0.05	**NS**
69	FMI vsTC/HDL	0.2460	>0.05	**NS**	0.1005	>0.05	**NS**
70	FMI vsHDL/LDL	-0.0265	>0.05	**NS**	0.0781	>0.05	**NS**
71	MM vs TC	-0.1606	>0.05	**NS**	0.0557	>0.05	**NS**
72	MM vs TG	0.1924	>0.05	**NS**	0.1330	>0.05	**NS**
73	MM vs HDL	-0.3217	>0.05	**NS**	-0.2918	>0.05	**NS**
74	MM vs LDL	-0.1637	>0.05	**NS**	0.0775	>0.05	**NS**
75	MM vsVLDL	0.1924	>0.05	**NS**	0.1312	>0.05	**NS**
76	MM vsTC/HDL	0.1319	>0.05	**NS**	0.2539	>0.05	**NS**
77	MM vsHDL/LDL	0.0173	>0.05	**NS**	-0.1568	>0.05	**NS**

p>0.05: Not Significant, *p: <0.05: Significant,



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