

Interrelationship Amongst Selected Metabolic Markers and Body Fat Distribution of Sedentary Mid Age Men

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Abstract: The objective of the present study was to find out the relationship between body fat distribution and selected metabolic variables of Bengalee mid-age males who confine themselves within physical activities required for routine living only. 15 working men aged 35-45 years were selected from Birbhum district of West Bengal, India as subjects for this study. Body fat distribution and selected metabolic markers were chosen as parameters. Body fat distribution was assessed from Body mass index (BMI), Waist to hip ratio (WHR) & % Body fat (BF) while selected metabolic variables were Systolic & diastolic blood pressure (SBP & DBP), fasting Blood glucose (BG), blood Triglycerides (BTGc), blood Cholesterol (BCh), HDL, LDL and VLDL. All tests and measuring procedures were standard. Descriptive statistics was used as statistical tool and Pearson's Product Moment Correlation was computed to find out associations amongst parameters. The level of significance was set at 0.05. The result revealed that there were significant relationship between BMI and blood triglycerides; VLDL and Systolic blood pressure.

Keyword: Body Fat Distribution, Metabolic Variables, Sedentary men.

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I. Introduction

Five major indicators of health risk are abdominal (central) obesity, elevated blood pressure, and elevated fasting plasma glucose, high serum triglycerides and low high-density cholesterol levels. These are the markers of metabolic syndrome i.e. a disorder of energy utilization and storage and diagnosed by a co-occurrence of three out of five indicators. People who do not exercise or undergo adequate physical activities regularly are prone to such health risk, specially with ageing which increases the risk of developing cardiovascular diseases, particularly heart failure and diabetes.

There is a wide range of body fat distribution in sedentary men. Research studies reveal that a predominantly upper body fat distribution is associated with an abnormal metabolic profile over a wide range of body mass indexes (Bjorntorp P, 1991; Kissebah AH, 1994). It is also recognized that increasing amounts of lower body fat are independently associated with a reduced risk of metabolic complications (Shijder MB, 2004). Arguably, central obesity is considered as the major factor in the metabolic syndrome (Bjorntorp, 1991 & Lamarche B, 1998). With this backdrop, it was deemed reasonable to investigate the status of body fat distribution in sedentary Bengalee middle age males and association of metabolic markers, if any.

II. Materials and Methods

Fifteen sedentary male subjects participated in this study. The age of the subjects ranged between 35 to 45 years and the study area was Birbhum District of West Bengal, India. The sampling technique was random and a static group design was adapted to the study.

Body fat distribution and selected metabolic markers were chosen as parameters for the study. Body fat distribution was estimated from body mass index (BMI), waist to hip ratio (WHR) & % body fat (BF) while selected metabolic markers were systolic & diastolic blood pressure (SP & DP), fasting blood glucose (BG), blood triglycerides (BTGc), blood cholesterol (BCh), high density lipoprotein (HDL), low density lipoprotein (LDL) & very low-density lipoprotein (VLDL). Body fat distribution was measured by using standard equations and measuring techniques whereas clinical tests and standard measurement procedures were used to test metabolic variables.

To assess the relationship among the selected variables, the data were analysed by applying descriptive statistics and Pearson’s product moment method of correlation were computed using Microsoft excel and SPSS Software version 23. The level of significance was set at 0.05.

III. Findings and Results

	Age (year)	Height (cm)	Weight (kg)
Mean	40.80	164.21	74.01
Standard Error of Mean	2.09	2.10	1.69
Standard Deviation	8.11	7.85	6.33
Minimum Score	29.00	150	63
Maximum score	59.00	174	81

	Body Fat Distribution			Selected Metabolic Markers							
	BMI (kg / m ²)	WHR	% BF	BG (F) (mg/dl)	BTGc (mg/dl)	BCh (mg/dl)	HDL (mg/dl)	LDL (mg/dl)	VLDL (mg/dl)	SBP (mmHg)	DBP (mmHg)
Mean	28.02*	0.94*	24.5*	94.63	158.00	172.13	48.53	92.20	31.60	120.53	79.87
SEM	0.37	0.01	1.09	5.47	21.27	7.69	1.22	7.18	4.25	2.67	1.70
SD	1.42	0.04	4.21	21.17	82.39	29.78	4.73	27.82	16.48	10.35	6.57
Min Score	26.53	0.88	15.85	78.00	105.00	140.00	41.00	61.00	21.00	100.00	70.00
Max Score	32.37	0.99	31.28	162.00	415.00	250.00	58.00	169.00	83.00	140.00	90.00

Abbreviation: SEM = Standard Error of Mean, SD = Standard Deviation, Min = Minimum, Max = Maximum, BMI = Body Mass Index, WHR = Waist to Hip Ratio, BF = Body Fat, BG (F) = Fasting Blood Glucose, BTGc = Blood Triglycerides, BCh = Blood Cholesterol, HDL = High Density Lipoprotein, LDL = Low Density Lipoprotein, VLDL = Very Low Density Lipoprotein, SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure

	BMI	
Normal		18.4 – 24.9
Normal	WHR	< 0.90
Average	% BF	18 – 24%

Blood Glucose (F) (mg/dl)	70-110
Blood Triglyceride (mg/dl)	65-170
Blood Cholesterol (mg/dl)	150-250
HDL (mg/dl)	35-55
LDL (mg/dl)	150-190
VLDL (mg/dl)	15-35

Table 2 shows that the mean age of the subjects was 40.80±8.11 years whereas the mean BMI was 28.02±1.42 kg/m²(Normal 18.4-24.9 kg/m²); the mean waist to hip ratio was 0.94±0.04 (Normal < 0.90) and the mean % of body fat was 24.5±4.21% (Normal ≤ 24%). All the parameters of body fat distribution are found above the normal range.

The mean blood glucose (F), triglycerides, cholesterol, HDL, LDL, VLDL, systolic blood pressure and diastolic blood pressure were 94.63±21.17 mg/dl, 158.00±82.39 mg/dl, 172.13±29.78 mg/dl, 48.53±4.73 mg/dl, 92.20±27.82 mg/dl, 31.60±16.48 mg/dl, 120.53±10.35 mmHg and 79.87±6.57 mmHg respectively of the subjects. It is observed that all the values of selected metabolic markers of the subjects were within the normal range.

Table 5: Correlation Matrix of All Selected Parameters

	BMI	WHR	% BF	BG (F)	BTGc	BCh	HDL	LDL	VLDL	SBP	DBP
BMI	1										
WHR	0.115	1									
% BF	0.185	0.516*	1								
BG (F)	-0.160	0.158	0.301	1							
BTGc	0.671*	0.144	0.014	-0.004	1						
BCh	0.023	0.111	-0.087	-0.222	0.354	1					
HDL	0.336	-0.090	-0.093	-0.136	0.806*	0.640*	1				
LDL	-0.433	0.043	-0.084	-0.216	-0.354	0.746*	0.034	1			
VLDL	0.671*	0.043	0.014	-0.004	1.000	0.354	0.806*	-0.354	1		
SBP	0.504*	0.145	0.342	0.367	0.425	0.246	0.379	-0.053	0.425	1	
DBP	0.460	0.060	0.103	0.043	0.463	0.038	0.402	-0.290	0.463	0.531*	1

*. Significant at 0.05 level
 $r_{05} (df = 13) = 0.514$

Abbreviation: BMI = Body Mass Index, WHR = Waist to Hip Ratio, BF = Body Fat, BG (F) = Fasting Blood Glucose, BTGc = Blood Triglycerides, BCh = Blood Cholesterol, HDL = High Density Lipoprotein, LDL = Low Density Lipoprotein, VLDL = Very Low Density Lipoprotein, SBP = Systolic Blood Pressure, DBP = Diastolic Blood Pressure

Table 5 shows that within the parameters of distribution of body fat, significant relationship exists only between waist-hip-ratio and % body fat. However, BMI has insignificant relationship with WHR and % body fat. Out of metabolic markers significant association has been observed between HDL and triglycerides; cholesterol and HDL & LDL; HDL and VLDL; SBP and DBP. BMI is the only parameter of body fat distribution which is found to be associated with metabolic parameters of Triglycerides, VLDL and Systolic blood pressure.

IV. Conclusion

The study observes that in spite of being obese (type I), all the metabolic markers of subjects were found within normal range. This might be due to the fact that subjects were not exposed to long-term negative lifestyle factors. However, significant association of BMI with triglyceride, VLDL and systolic blood pressure are alarming.

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