ORIGINAL RESEARCH

Assessment of hs-CRP level in centrally obese patients

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ABSTRACT
Background: Obesity comorbidities include coronary heart disease, hypertension and stroke, certain types of cancer, non-insulin-dependent diabetes mellitus, gallbladder disease, dyslipidaemia, osteoarthritis and gout, and pulmonary diseases, including sleep apnoea. The present study was conducted to assess hs-CRP in centrally obese patients.
Materials & Methods: 145 subjects of both genders were subjected to assessment of blood pressure, body weight, height and body mass index (BMI). Measurement of hs-CRP was performed.
Results: Out of 145 patients, males were 80 and females were 65. The mean height in males was 5.8 feet and in females was 5.4 feet, weight was 78.2 kgs and in females was 67.5 kgs. The mean BMI was 25.4 Kg/m^2 in males and 23.6 Kg/m^2 in females. The difference was significant (P< 0.05). The mean CRP level in normal subjects was 3.4 mg/dl, in overweight was 6.5 mg/dl, in class I obese was 8.2 mg/dl, in class II obese was 12.1 mg/dl and in class III obese was 14.3 mg/dl. The difference was significant (P< 0.05).
Conclusion: hs-CRP in centrally obese patients was significantly high as compared to normal subjects.
Key words: CRP, Obesity, Height

INTRODUCTION
The prevalence of overweight and obesity among children and adolescents aged 5-19 has risen dramatically from just 4% in 1975 to just over 18% in 2016.[1] The rise has occurred similarly among both boys and girls: in 2016, 18% of girls and 19% of boys were overweight. While just under 1% of children and adolescents aged 5-19 were obese in 1975, more 124 million children and adolescents (6% of girls and 8% of boys) were obese in 2016.[2] Overweight and obesity are linked to more deaths worldwide than underweight. Globally there are more people who are obese than underweight this occurs in every region except parts of sub-Saharan Africa and Asia.[3]
Obesity comorbidities include coronary heart disease, hypertension and stroke, certain types of cancer, non-insulin-dependent diabetes mellitus, gallbladder disease, dyslipidaemia, osteoarthritis and gout, and pulmonary diseases, including sleep apnoea.[4] C-reactive protein (CRP) is a marker of low grade chronic systemic inflammation, a pentameric protein produced by the liver has emerged as the 'golden marker for inflammation. One of the factors which pose a considerable health risk especially for cardiovascular diseases is obesity and

overweight and elevated levels of CRP. CRP levels above 10 mg/l have been associated with increased risk of myocardial infarction, ischemic stroke and peripheral arterial disease.[5] The present study was conducted to assess hs-CRP in centrally obese patients.

MATERIALS & METHODS
The present study comprised of 145 subjects of both genders. Written consent was obtained from all subjects.
Data such as name, age, gender etc. was recorded. A complete examination was done. Blood pressure and body weight was measured. Body Mass Index (BMI) was calculated as weight in kg/height in m.[2] Two ml of blood sample in EDTA was taken by venepuncture of antecubital vein for the following haematological and biochemical investigations- haemoglobin, total leucocyte count (TLC), differential leucocyte count (DLC), fasting and random blood glucose levels, renal profile such as blood urea, S. Creatinine, lipid profile such as cholesterol, triglycerides, HDL, LDL. Estimation of hs-CRP was performed with hs-CRP activity kit. Results were tabulated and subjected to statistical analysis. P value less than 0.05 was considered significant.

RESULTS
Table I Distribution of subjects

Total- 145		
Gender	Males	Females
Number	80	65

Table I shows that out of 145 patients, males were 80 and females were 65.

Table II Assessment of parameters

Parameters	Males	Females	P value
Height (Feet)	5.8	5.4	0.92
Weight (Kg)	78.2	67.5	0.02
BMI (Kg/m^2)	25.4	23.6	0.05

Table II, graph I shows that mean height in males was 5.8 feet and in females was 5.4 feet, weight was 78.2 kgs and in females was 67.5 kgs. The mean BMI was 25.4 Kg/m^2 in males and 23.6 Kg/m^2 in females. The difference was significant (P< 0.05).
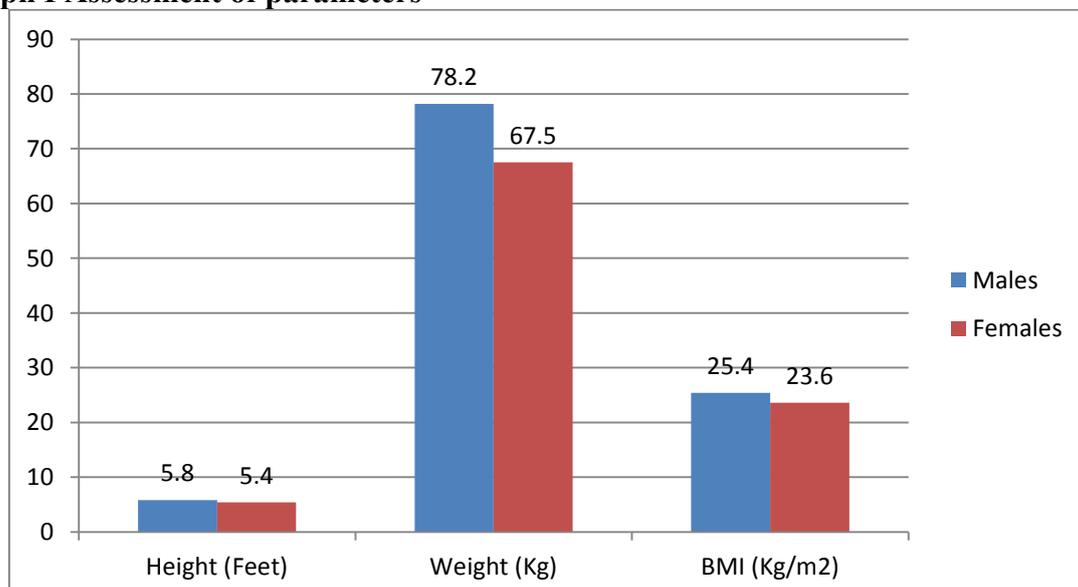
Graph I Assessment of parameters

Table III CRP level and BMI

BMI	CRP level (mg/dl)	P value
Normal	3.4	0.02
Overweight	6.5	
Class I Obese	8.2	
Class II Obese	12.1	
Class III Obese	14.3	

Table III shows that the mean CRP level in normal subjects was 3.4 mg/dl, in overweight was 6.5 mg/dl, in class I obese was 8.2 mg/dl, in class II obese was 12.1 mg/dl and in class III obese was 14.3 mg/dl. The difference was significant (P< 0.05).

DISCUSSION

The metabolic syndrome is a cluster of the heart attack risk factors: diabetes and pre-diabetes, abdominal obesity, high cholesterol and high blood pressure.[6] It is estimated that around a quarter of the world's adult population have metabolic syndrome and they are twice as likely to die from and three times as likely to have a heart attack or stroke compared with people without the syndrome.[7] In addition, people with metabolic syndrome have a fivefold greater risk of developing type II diabetes.[8] The clustering of CVD risk factors that typifies the metabolic syndrome is now considered to be the driving force for a CVD epidemic.[9] The present study was conducted to assess hs-CRP in centrally obese patients.

We found that out of 145 patients, males were 80 and females were 65. Ramachandran et al[10] included 475 subjects. Their results showed Met S was present in 41.1%. WC was increased in 31.4%, TG in 45.6%, low HDL-C in 65.5%, hypertension in 55.4% and raised FPG 26.7%. Met S was present in 27.9% of subjects with FPG<6.1 mmol/l and its prevalence increased to >70% with higher FPG values. Met S was more common in women than in men (46.5 vs. 36.4%, $\chi2$=4.6, P=0.03) and in older people. IR was more prevalent in Met S and was a component of two clusters but it was not a core component in factor analysis. They concluded that Met S is common in Asian Indians. Its prevalence is age-related, and is more common in women. HOMA–IR or fasting plasma insulin was not a core component of the Met S.

We observed that mean height in males was 5.8 feet and in females was 5.4 feet, weight was 78.2 kgs and in females was 67.5 kgs. The mean BMI was 25.4 Kg/m^2 in males and 23.6 Kg/m^2 in females. Jialal et al[11] studied that circulating levels of high-sensitivity C-reactive protein, interleukin (IL)-1b, IL-6, IL-8, and soluble tumor necrosis factor receptor-1 were significantly increased in MetS versus control subjects following adjustment for waist circumference. There was a significant increase in both TLR2 and TLR4 surface expression and mRNA on monocytes after adjustment for waist circumference. In addition to increased nuclear factor-kB nuclear binding, there was significantly increased release of IL-1b, IL-6, and IL-8 in MetS versus control subjects following priming of the monocytes with lipopolysaccharides. While both plasma free fatty acids and endotoxin were increased in Met S, they correlated significantly with TLR4 only.

We found that the mean CRP level in normal subjects was 3.4 mg/dl, in overweight was 6.5 mg/dl, in class I obese was 8.2 mg/dl, in class II obese was 12.1 mg/dl and in class III obese was 14.3 mg/dl. Habib and Masri[12] observed that there were non-significant differences in age, weight and BMI among healthy subjects and CAD patients. While hsCRP levels were significantly higher in CAD patients compared to healthy individuals. CAD patients had significantly higher TG (p=0.0074) and significantly lower HDL (p=0.0001) levels compared to control subjects. Although CAD patients presented with higher hsCRP levels but there was no significant correlation of CAD severity with hsCRP or blood lipids.

Billhorn et al[13] observed that HDL cholesterol is inversely associated with cardiovascular disease. hs-CRP >3 mg/L in the presence of HDL cholesterol of ≥60 mg/dl is associated with

an attenuation in the protective association of HDL cholesterol ≥60 mg/dl and CRP of ≤3 mg/L with CHD and CVD.

CONCLUSION
Authors found hs-CRP in centrally obese patients was significantly high as compared to normal subjects.

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