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Assessment of prevalence of metabolic syndrome in abdominal obesity

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***Abstract*---**Background: Metabolic syndrome is defined as a cluster of at least three out of five cardio-metabolic abnormalities which occur concomitantly. The present study was conducted to prevalence of metabolic syndrome in abdominal obesity. Materials & Methods: 174 patients of both genders were included. Height (cm) and weight (kgs) was measured. Waist circumference (WC) was measured. Subjects were classified as having abdominal obesity when the WC was at or above the 90th percentile for age and gender charts. Blood pressure was measured. Results: Out of 174 subjects, males were 90 and females were 84. MS was seen in 10 males and 6 females. There were 13 obese and 3 non- obese. Smoking was present in 9 and absent in 7. Alcoholism was seen in 12 and absent in 4. Hyperglycemia was present in 11 and absent in 5. Hypertriglyceridemia was present in 14 and absent in 2. Low HDL-C was seen in 11 and absent in 5. Hypertension was present in 9 and absent in 7 MS patients. The difference was significant (P< 0.05). Conclusion: There was high prevalence of MS in males as compared to females. Risk factors were smoking, alcoholism, hyperglycemia, hypertriglyceridemia, low HDL-C and hypertension.

***Keywords*---**Abdominal obesity, Hypertension Waist circumference, metabolic syndrome.

Introduction

Increasing prevalence of obesity is a worldwide health concern because excess weight gain causes an increased risk for several diseases, most notably cardiovascular diseases, diabetes, and cancers. The global food system drivers interact with local environmental and genetic factors to create a wide variation in obesity prevalence between populations. Epidemiologically, in low-income countries, obesity mostly affects middle-aged adults, whereas in high-income countries it affects both sexes and all ages.[1] Abdominal obesity is emerging as an

important driving force behind the deterioration of cardiometabolic risk in the general population. Patients with evidence of cardiovascular disease often display abdominal obesity, and observational studies have identified abdominal obesity as a predictor of adverse metabolic or cardiovascular outcomes independently of body mass index (BMI).[2]

Metabolic syndrome is defined as a cluster of at least three out of five cardio-metabolic abnormalities which occur concomitantly.[3] These abnormalities are abdominal obesity, hyperglycemia, hypertriglyceridemia, low HDL-cholesterol, and hypertension. It is unclear to what extent the contributing components differ between populations with a different ethnic background.[4] Typically, upper body obesity (android, 'apple shape' obesity) is more commonly found in men, whereas lower body obesity (gynoid, 'pear shape') is more commonly found in women. Upper body obesity receives contributions from adiposity in subcutaneous and intra-abdominal compartments. Intra-abdominal fat (visceral fat) has been defined as the fat located around the viscera and within the peritoneum, the dorsal border of the intestines and the ventral surface of the kidney.[5] The present study was conducted to prevalence of metabolic syndrome in abdominal obesity.

Materials & Methods

The present study comprised of 174 patients of both genders. The consent was obtained from all enrolled patients. Data such as name, age, gender etc. was recorded. An anthropometric and general physical measurement was carried out. Height (cm) and weight (kgs) was measured. Waist circumference (WC) was measured standing, using a nonstretchable tape at a midpoint between a lower border of the ribcage and the iliac crest during minimal respiration, and to the nearest 0.1 cm.

Subjects were classified as having abdominal obesity when the WC was at or above the 90th percentile for age and gender charts. Blood pressure was measured using a mercury sphygmomanometer of appropriately sized cuff in sitting position. Blood samples were obtained through an antecubital vein using vacutainer tubes containing ethylenediamine tetraacetic acid (EDTA). High-density lipoprotein (HDL)- cholesterol and serum triglycerides were assessed. Fasting blood glucose was measured using a glucometer by glucose oxidase method. The MS was defined as present when the subjects had three or more than three of the following five metabolic components as per National Cholesterol Education Program Adult Treatment Panel Third -III criteria modified by Cook, et al. for age. High blood pressure (>90th percentile for age, sex, and height). Abdominal obesity (WC > 90th percentile for age and sex). Hypertriglyceridemia (Triglycerides >110 mg/dl). High fasting glucose (>110 mg/dl). Low HDL cholesterol (HDL < 40 mg/dl). Data thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

Results

Table I Distribution of patients

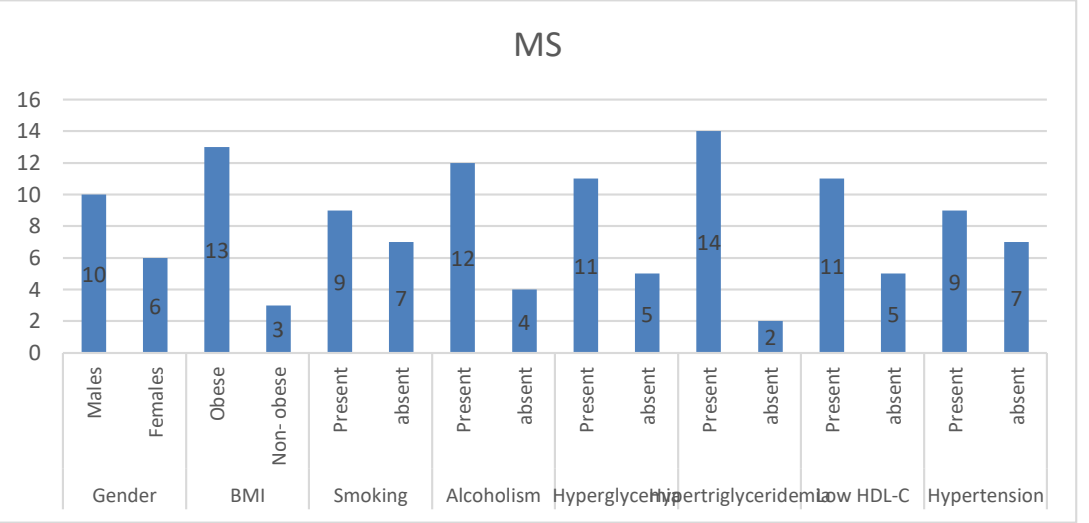
Total-174		
Gender	Males	Females
Number	90	84

Table I shows that out of 174 subjects, males were 90 and females were 84.

Table II Demographic characteristics and prevalence of the metabolic syndrome

Parameters	Variables	MS	P value
Gender	Males	10	0.02
	Females	6	
BMI	Obese	13	0.01
	Non- obese	3	
Smoking	Present	9	0.81
	absent	7	
Alcoholism	Present	12	0.02
	absent	4	
Hyperglycemia	Present	11	0.04
	absent	5	
Hypertriglyceridemia	Present	14	0.03
	absent	2	
Low HDL-C	Present	11	0.05
	absent	5	
Hypertension	Present	9	0.81
	absent	7	

Table II, graph I shows that MS was seen in 10 males and 6 females. There were 13 obese and 3 non- obese. Smoking was present in 9 and absent in 7. Alcoholism was seen in 12 and absent in 4. Hyperglycemia was present in 11 and absent in 5. Hypertriglyceridemia was present in 14 and absent in 2. Low HDL-C was seen in 11 and absent in 5. Hypertension was present in 9 and absent in 7 MS patients. The difference was significant ($P< 0.05$).



Graph I Demographic characteristics and prevalence of the metabolic syndrome

Discussion

Excess intra-abdominal adiposity has the potential to influence metabolism and cardiometabolic risk directly, through alterations in the secretion of adipokines.[6,7] Abdominal obesity promotes increased secretion of a range of metabolites and of biologically active substances, including glycerol, free fatty acids (FFA), inflammatory mediators [e.g. tumour necrosis factor alpha (TNFa) and interleukin-6 (IL-6)], plasminogen activator inhibitor-1 (PAI-1), and C-reactive protein.[8] The secretion of adiponectin, an apparently cardioprotective adipokine, has been shown to be reduced in abdominally obese patients.[9] The present study was conducted to prevalence of metabolic syndrome in abdominal obesity.

We found that out of 174 subjects, males were 90 and females were 84. Sigit et al[10] estimated the prevalence of metabolic syndrome and the relative contribution of its components in the Indonesian and the Dutch population, as well as to examine the associations of overall and abdominal obesity with metabolic syndrome. study of middle-aged adults in the Netherlands Epidemiology of Obesity Study (n=6602) and the Indonesian National Health Surveillance (n=10,575), metabolic syndrome was defned by the unifed IDF and AHA/NHLBI criteria. The prevalence of metabolic syndrome was 28% and 46% in Indonesian men and women, and 36% and 24% in Dutch men and women. The most prominent components were hypertension (61%) and hyperglycemia (51%) in the Indonesian, and hypertension (62%) and abdominal obesity (40%) in the Dutch population. Per SD in BMI and waist circumference, odds ratios (ORs, 95% CI) of metabolic syndrome were 1.5 (1.3–1.8) and 2.3 (1.9–2.7) in Indonesian men and 1.7 (1.2–2.5) and 2.9 (2.1–4.1) in Dutch men. The ORs of metabolic syndrome were 1.4 (1.2–1.6) and 2.3 (2.0–2.7) in Indonesian women and 1.0 (0.8–1.3) and 4.2 (3.2–5.4) in Dutch women.

We observed that MS was seen in 10 males and 6 females. There were 13 obese and 3 non- obese. Smoking was present in 9 and absent in 7. Alcoholism was seen in 12 and absent in 4. Hyperglycemia was present in 11 and absent in 5. Hypertriglyceridemia was present in 14 and absent in 2. Low HDL-C was seen in 11 and absent in 5. Hypertension was present in 9 and absent in 7 MS patients. Singh et al[11] estimated the prevalence of metabolic syndrome among adolescents attending school in the Jammu region, India. Relevant metabolic and anthropometric variables were analyzed and criteria suggested by National Cholesterol Education Program Adult Treatment Panel Third (NCEP-ATP III) modified for age was used to define metabolic syndrome. The overall prevalence of metabolic syndrome was 2.6%. Prevalence of metabolic syndrome was higher in males (3.84%) than in females (1.6%) and slightly higher in urban area (2.80%) than in rural area (2.52%), whereas prevalence of metabolic syndrome among centrally obese subjects was as high as 33.33%. High density lipoprotein cholesterol was the most common and high blood pressure was the least common constituent of metabolic syndrome. Metabolic syndrome was most prevalent in 16-18 years age group (4.79%).

Thirty-nine articles and one national health report that were undertaken to consideration; in 16 of the 23 countries with national representative data using the International Obesity Task Force (IOTF) cutoff, over-weight and obesity prevalence were found to be higher than 20%, five countries showed prevalence above 30%, and only in two countries prevalence was lower than 10%. Data from the National Health and Nutrition Examination Survey 2009–10 (NHANES) indicated a prevalence of overweight and obesity among 4111 adolescents aged 12 through 19 years of 15.2% and 18.4%, respectively.[12]

Conclusion

Authors found that there was high prevalence of MS in males as compared to females. Risk factors were smoking, alcoholism, hyperglycemia, hypertriglyceridemia, low HDL-C and hypertension.

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