

PATTERN OF METABOLIC SYNDROME IN CLINICAL PRACTICE

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Abstract:

1068 randomly sampled adult Bangladeshi people were studied during a period of six months from October 2004 to March 2005. It was a randomized, prospective study. Cases that fulfilled two criteria of metabolic syndrome (MetS) were evaluated to see pattern and types of MetS. Out of 1068 patients, 110 (10.3%) fulfilled the inclusion criteria. 101 (9.4%) cases were labeled as metabolic syndrome according to NCEP ATP III criteria, 09 cases had only two criteria. 40 cases were male & 70 cases were female (M:F= 1:1.8). Mean age of patients with was 44.88, ranging from the age of 20-68 years. Majority (55%) of the patients were in the age group of 30-49 years. Half of the cases had BMI 30-34.9. Mean body weight of male was 85.9 kg and of female was 78.2 kg. Mean waist circumference of male was 41.7 inches and of female 40 inches. Mean HDL for male was 38.3 mg/dL and for female is 40.2 mg/dL. Mean Triglyceride for male was 172.1 and for female was 169.3 mg/dL. Mean total cholesterol for male was 216.7 and for female was 207.6 mg/dL. Mean systolic blood pressure (SBP) for men is 162 mm Hg & diastolic blood pressure (DBP) 99 mm Hg and for female mean SBP 155 and DBP 96 mm Hg. Metabolic syndrome is more prevalent in the 3rd and 4th decade of life in both sexes. It is almost twice common in female than male. Combination of hypertension, obesity & dyslipidemia comprises nearly 40% of its presentation.

Introduction:

Metabolic Syndrome (MetS) refers to a clustering of specific cardiovascular disease risk factors whose underlying pathophysiology is thought to be related to insulin resistance. This risk factor clustering, and its association with insulin resistance led investigators to propose the existence of a unique pathophysiological condition- the “metabolic” or “insulin resistance” syndrome. This concept was unified and extended with the landmark publication of Reaven’s 1988 Banting Medal award lecture.¹ Although obesity was not included in Reaven’s primary list of disorders caused by insulin resistance, he acknowledged that it, too, was correlated with insulin resistance or hyperinsulinemia, and that the obvious “treatment” for what he termed “syndrome X” was weight maintenance (or weight loss) and physical activity. People with the metabolic syndrome are at increased risk for developing diabetes mellitus and cardiovascular

disease as well as increased mortality from cardiovascular disease and all causes.²⁻⁴ Beyond CVD and type 2 diabetes, individuals with metabolic syndrome seemingly are susceptible to other conditions, notably polycystic ovary syndrome, fatty liver, cholesterol gallstones, asthma, sleep disturbances, and some forms of cancer.⁵

Although there are divergent criteria for the identification of the MetS, they all tend to agree that the MetS core components include obesity, insulin resistance, dyslipidemia, and hypertension.⁶ The first formal definition of the MetS was put forth in 1998 by the World Health Organization (WHO).⁷ The European Group for the Study of Insulin Resistance (EGIR) published a separate set of criteria shortly thereafter.⁸ In 2001, the NCEP: ATP III published a new set of criteria based on common clinical measurements: Waist circumference (WC), blood lipids, blood pressure, and fasting glucose Table-I.⁹

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Table-I
Criteria for MetS definition:

WHO,1998 ⁷	EGIR,1999 ⁸	NCEP:ATP III 2001 ¹⁰
High insulin levels, IFG or IGT, and two of the following: Abdominal obesity: WHR > 0.9, BMI > 30 kg/m ² , WC > 37 inches Lipid panel with triglycerides > 150 mg/dl, HDL-C <35 mg/dl BP >140/90 mm Hg	FPG >6.0 but not DM, BP e"140/90, TG >2 m mol/l (180mg/dl), HDL<1.0mmol/l (40mg/dl), WC > 94 cm in men and > 80 cm in women	FPG >6.0 mmol/L, BP e"130/85, TG>=1.7mmol/L (150mg/dl), HDL Men < 1.0 mmol/l (40mg/dl)Women<1.3 mmol/l (50mg/dl), WC > 102 cm in men or > 88 cm in women

WHR: Waist-to-hip ratio; BP: blood pressure; FPG: fasting plasma glucose. WC: Waist Circumference. In 2003, the ADA changed the criteria for IFG tolerance from >110 mg/dl to >100 mg/dl,

The prevalence of the metabolic syndrome as defined by ATP III in our country is unknown. Because the implications of the metabolic syndrome for health care are substantial, we sought to establish the prevalence and pattern of this condition.

Materials & Methods:

1068 patients were enrolled for a period of six month (October' 04 – March' 05). NCEP ATP III 2001 criteria were used to diagnose metabolic syndrome in our cohort of population. Patients who had two criteria primarily were included for study. They were thoroughly interviewed as per the protocol and related investigations were done. Three criteria that fulfill the diagnosis of metabolic syndrome are: (i) Abdominal obesity (waist circumference), Men >102 cm (40inch); Women >88 cm (35 inch) (ii) Blood pressure, >130/mm of Hg (iii) Fasting blood glucose >110 mg/ dl. All the patients included in this study were above 20 years of age. Patients were excluded who had co-morbidity like CRF, CHD, and taking steroid for some other diseases because that would influence the inclusion criteria of metabolic syndrome. Lipid profile estimation was done after 10 hours fasting by Human GmbH kit. Blood sugar estimation was done by Human Gumbo kit. Body weight measurement was done by standard weighing measuring machine.

Fiber made simple measuring tape was used to measure abdominal girth. Types of MBI have been classified as follows: A-BMI <24.9; B-BMI 25-29.9; C-BMI 30-34.9; D-BMI 35-39.9 and E-BMI > 40. Combination criteria of metabolic syndrome have also been asserted as: DDyO-Diabetes, Dyslipedemia & Obesity; DHO- Diabetes, Hypertension & Obesity; DDyHO- Diabetes, Dyslipedemia, Hypertension & Obesity; DDyH- Diabetes, Dyslipedemia &

Hypertension; DyHO- Dyslipedemia, Hypertension & Obesity; and Others (HO-Hypertension, Obesity and HOW-Hypertension, Over weight).

Results:

Out of 1068 cases 101 (9.4%) fulfilled three criteria of metabolic syndrome. 09 cases fulfilled only two criteria. 40 cases male & 70 cases female (M:F= 1:1.8). Mean age of patients with SD is 44.88 ± 12.28 ranging from the age of 20-68 years. With the increase in age number of patients increased (Fig.-1). 61 patients (55%) are between 3rd and 4th decade of age. 50% patients were obese, 22% moderately obese, only 5% had severe obesity. 15% were over weight and 8% had normal body weight. Table-II shows the patient profile. 35 (38.5%) patients had DyHO, 25 (27.5%) patients had DDyH, 22 (24.2%) patients had DDyHO, 13 (14.3%) patients had DHO, 6 (6.6%) patients had DDyO, and 9 (9.9%) patients had other types (Table-III).

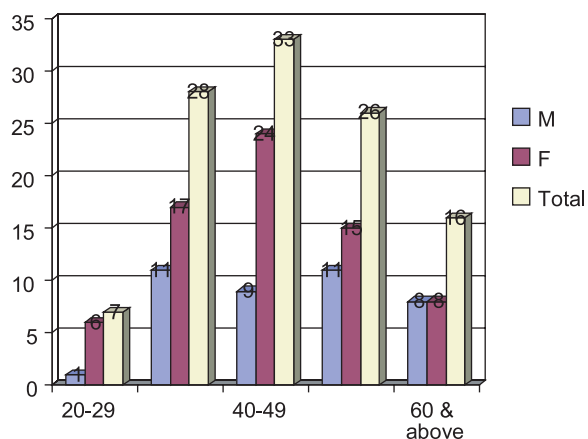


Fig.-1: Shows age specific prevalence of metabolic syndrome in adults

Table-II
Shows of different parameter of patient profile

Parameters	Male		Female	
	Mean	SD +	Mean	SD±
Body weight	85.95	13.57	78.22	14.58
Waist circumference	41.67	4.35	39.97	3.91
Total cholesterol	216.73	40.96	207.61	49.18
LDL	147.6	35.55	136.1	40.6
HDL	38.36	5.88	40.21	8.9
TG	172.17	61.83	169.38	82.22
PPBS	10.6	4.83	10.45	5.05
Systolic BP	162	20.28	155	33.87
Diastolic BP	99	10.37	96	12
FBS	7.8	2.87	8.14	2.94

Table -III
Patterns of Metabolic syndrome in study population

Pattern of MetS	Number	Percentage
DyHO	35	38.5
DDyH	25	27.5
DDyHO	22	24.2
DHO	13	14.3
DDyO	6	6.6
Others	9	9.9

Discussion:

The prevalence of the MetS is increasing to epidemic proportions not only in the United States and the remainder of the urbanized world but also in developing nations and an increasing trend has been observed in Asian countries.^{11,12} Urbanization, modern lifestyle, change of food habit cumulatively contributes for this development of metabolic syndrome. We have applied the NCEP ATP III panel criteria 2002 to assess the prevalence and pattern of metabolic syndrome among Bangladeshi adult. The prevalence of metabolic syndrome is 9.4% in our study. Prevalence is 1.8 times more in female than male. Prevalence of metabolic syndrome seems to be much lower than some other population. To estimate prevalence of MetS in USA a large scale study was undertaken. Analysis of data was done on 8814 men and women aged 20 years or older from the Third

National Health and Nutrition Examination Survey (1988-1994), a cross-sectional health survey of a nationally representative sample of the non-institutionalized civilian US population. Prevalence of the metabolic syndrome was defined by ATP III criteria. The unadjusted and age-adjusted prevalence of the metabolic syndrome were 21.8% and 23.7%, respectively.¹³ The prevalence increased from 6.7% among participants aged 20 through 29 years to 43.5% and 42.0% for participants aged 60 through 69 years and aged at least 70 years, respectively. Mexican Americans had the highest age-adjusted prevalence of the metabolic syndrome (31.9%). The age-adjusted prevalence was similar for men (24.0%) and women (23.4%). However, among African Americans, women had about a 57% higher prevalence than men did and among Mexican Americans, women had about a 26% higher prevalence than men did. Using 2000 census data, about 47 million US residents have the metabolic syndrome.¹³

In Finland and Sweden MetS prevalence was studied using WHO definition of MetS. A total of 4,483 subjects aged 35–70 years participating in a large family study of type 2 diabetes in Finland and Sweden (the Botnia study) were included in the analysis of cardiovascular risk associated with the metabolic syndrome. In subjects who had type 2 diabetes ($n = 1,697$), impaired fasting glucose (IFG)/impaired glucose tolerance (IGT) ($n = 798$), or insulin-resistance with normal glucose tolerance (NGT) ($n = 1,988$), the metabolic syndrome was defined as presence of at least two of the following risk factors:

obesity, hypertension, dyslipidemia, or microalbuminuria. Cardiovascular mortality was assessed in 3,606 subjects with a median follow-up of 6.9 years. In women and men, respectively, the metabolic syndrome was seen in 10 and 15% of subjects with NGT, 42 and 64% of those with IFG/IGT, and 78 and 84% of those with type 2 diabetes.¹⁴ The risk for coronary heart disease and stroke was increased threefold in subjects with the syndrome ($p < 0.001$). Cardiovascular mortality was markedly increased in subjects with the metabolic syndrome (12.0 vs. 2.2%, $p < 0.001$). Of the individual components of the metabolic syndrome, microalbuminuria conferred the strongest risk of cardiovascular death (RR 2.80; $p = 0.002$).¹⁴

Changes in the characteristics of metabolic syndrome in South Korea was assessed between 1998 to 2001. Metabolic syndrome was defined according to NCEP ATP III criteria. The age-adjusted prevalence of metabolic syndrome was significantly higher in the 2001 survey than in 1998 survey (28.0 vs. 23.6%, $P < 0.01$). This represents an 18.6% increase in prevalence over 3 years (i.e., ~6% per annum).¹⁵

As because metabolic syndrome yet not have an universally acceptable definition for all ethnic class of population so prevalence and different modalities of presentation differs from different ethnic group in a same class for different criteria of definition at different time. To make an absolute conclusion and apprehension of risk of metabolic syndrome is a very difficult task.

Conclusion:

Metabolic syndrome is not only the problem for the affluent class and for the western countries only. It is a new hidden burden for the Bangladeshi population too. The prevalence of metabolic syndrome in our study is much lower than that of many other populations of the world. A larger population based study is required to find out the magnitude of metabolic syndrome in Bangladeshi population.

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