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Original Article

Age and Gender Differences of Metabolic Factors among the Essential Hypertension Patients at a Tertiary Care Hospital in Dhaka

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Abstract

Background: Metabolic syndrome is a risk factor for cardiovascular disease. **Objectives:** The purpose of the present study was to see the association of metabolic syndrome with essential hypertension. **Methodology:** This cross sectional study was carried out in the OPD of the Department of Cardiology at Shaheed Suhrawardy Medical college Hospital, Dhaka from January 2008 to December 2010. All the All the Metabolic syndrome was defined as abnormal fasting serum level of glucose (≥ 110 mg/dl or 6.1 mmol/L) with abdominal obesity (waist circumference > 102 cm in men and > 88cm in women), triglycerides (≥ 150mg/dl), High density lipoprotein cholesterol (< 40 mg/dl in men and < 50 mg/dl in women) and hypertension. **Results:** . A total of 322 patients were enrolled Among hypertensive patients 31.8% had hyperglycemia, 37.9% had high waist circumference, 69.8% had low HDL cholesterol and 54.3% high triglycerides. As per definition of NCEP-ATP-III, metabolic syndrome had been detected in 17% of male, 37% of female and 27% of total population. **Conclusion:** Metabolic factors are a common association in hypertensive cases. These patients are at increased risk of coronary and cerebro-vascular disease and require more vigorous prevention. Furthermore in all hypertensive patients metabolic screening is recommended. [Journal of Science Foundation 2014;12(2): 34-38]

Keywords: Hypertension; metabolic syndrome; lipid profiles; essential hypertension

Introduction

Metabolic syndrome is a conglomeration of obesity, abnormal glucose metabolism, dyslipedemia and hypertension. These factors tend to aggregate together and in that case increase the risk of cardiovascular disease development (Wilson and Grundy 2003). Metabolic syndrome predicts the onset of diabetes (Satter et al., 2003) and cardiovascular disease (Alexander et al., 2003).

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The National Cholesterol Education Program-Adult Treatment Panel III (NCEP-ATP III) defined metabolic syndrome as presence of ant three or more of (a) waist circumference > 102 cm in men, > 88 cm in women, (b) low HDL <40 mg/dl in men, <50 mg/dl in women, (c) hyperglycemia ≥ 150 mg/dl, (d) high blood pressure ≥ 130/85 mm of Hg or documented use of antihypertensive therapy, (e) high fasting blood glucose ≥ 110 mg/dl or 6.1 mmol/L (National Heart Lung and Blood Institute 2001). Metabolic syndrome in Asia is more prevalent than any other part of the world. Asians generally tend to have higher prevalence of CHD. This is because Asians have central obesity and diabetes (McKeigue et al., 1991). High BP is considered to be one of the important features of metabolic syndrome (Zavaroni et al., 1992).

Hypertension is a common cardiovascular risk factor. Other cardiovascular risk factors cluster together around hypertension which ultimately manifest into CHD (Reaven 1998). The proper findings of metabolic syndrome are a key to prevent cardiovascular disease. Hypertension is a component of metabolic syndrome with which patients are at increased risk for cardiovascular disease.

Therefore an early diagnosis of metabolic syndrome in hypertensive patients of Bangladesh deserve due attention for prevention of diabetes and CHD. This is important because it is largely prevented by lifestyle modifications. But magnitude of metabolic syndrome in Bangladeshi population is not known. Therefore the purpose of the present study was to see the association of metabolic syndrome with essential hypertension..

Methodology

This study was carried out in outdoor department of Cardiology, Shaheed Suhrawardy Medical College Hospital, Dhaka. A total of 322 patients were enrolled from January 2008 to December 2010. Patients with records of high blood pressure or history of hypertension with medication were selected for study. Clinical history, dietary habit, hypertension, treatment regarding diabetes and anthropometric measurement (height, weight and waist circumference) were taken. Patients were advised to take rest for 5 minutes, then blood pressure was measured in sitting position with arm at the level of heart. Systolic pressure was noted at appearance of Korotkoff sound (phase-I) and diastolic pressure was noted at disappearance of sound (Korotkoff phase-V). Pressure was recorded in both arms and average measurement was taken. In this study hypertension was defined as systolic blood pressure 140 mm of Hg and diastolic blood pressure of 90 mm of Hg or more or use of antihypertensive drugs. Anthropometric measurements included waist circumference in cm, height in cm and weight in kg; waist circumference was measured in standing position with feet together and arms at the side of the abdomen relaxed. A tape was placed around the waist at the level of umbilicus midway between the bottom of rib and top of hipbone. Tape was placed firmly with no clothes in between. Patients were asked to do biochemical investigation in the biochemistry department of this medical college on the following day after overnight fasting. Venous whole blood samples were collected for measuring glucose, total cholesterol, HDL cholesterol, LDL cholesterol and triglycerides. Serum glucose level was measured using the glucose oxidase method and lipid profile by enzymatic method. Measurements were performed in the department of biochemistry by the auto analyzer Stat Fax 3300 USA machine. Data were analyzed using statistical analysis system. Mean and standard deviations were calculated for the quantitative variables. Percentage and standard error were calculated for frequency variables. A p value ≤ 0.05 was considered statistically significant.

Results

The mean age of the patients was 47.7 ±11.1. The patients' characteristics and mean level of variables are given in table 1. Age specific prevalence of individual trait of metabolic syndrome is shown in table 2. Large waist circumference and high blood glucose level were more frequently observed in 40-70 years of age whereas no difference was observed in any age group regarding HDL cholesterol and triglycerides.

Among hypertensive patients, 31.8% had hyperglycemia, 37.9% had high waist circumference, 69.8% had low HDL cholesterol and 54.3% had high triglycerides (table 3). As per definition of NCEP-ATP-III, metabolic syndrome had been detected in 17% of male, 37% of female and 27% of the total population. All traits were present in 1.5% of male and 13.9% of female (table 3).

Table 1: Mean and standard deviation of quantitative variables in patients with hypertension

Variables	Male	Female	Total
Frequency	212(65.8%)	110(34.2%)	322(100.0%)
Age (Mean ±SD years)	47.7±11.1	44.99±9.6	46.35±10.35
Height (Mean ±SD cm)	159.9±6.4	149.1±5.5	155±6.0
Weight (Mean ±SD Kg)	64±9.4	57.2±9.0	60.6±9.2
BMI (Mean ±SD)	22.5±2.4	23.7±3.2	23.1±2.8
Waist (Mean ±SD cm)	85.1±7.9	84.5±9.3	84.8±8.6
Pulse (beats/minute)	79.1±9.0	80.3±10.1	79.7±9.56
Systolic BP (Mean ±SD)	154.7±22.2	156.0±22.1	155.4±22.15
Diastolic BP (Mean ±SD)	94.6±11.6	95.2±11.2	95.0±10.4

Discussion

Cardiovascular mortality is increased in subjects with the metabolic syndrome (Isomaa et al., 2001). In this study it is observed that 17% men and 37% women are having metabolic syndrome. This is very high as compared to another study conducted in free living sample of rural Bangladeshi women in which the prevalence was less than 3% (Zaman et al., 2006). It was also higher than that was found in Asian which was 14% men and 19% women (Park et al., 2004) and European which was 10% men and 13% women (Isomaa et al., 2001).

Table 2: Biochemical parameter of Study Population

Variables	Male	Female	Total
Frequency	159(52.3%)	145(47.7%)	304(100.0%)
Plasma glucose (mmol/L)	5.6±1.7	4.6±2.1	5.1±1.9
Total cholesterol (mg/dL)	182.6±37.2	187.6±39.7	185.1±38.5
HDL cholesterol (mg/dL)	39.2±6.1	39.4±8.3	38.3±7.2
LDL cholesterol (mg/dL)	105.1±36.6	110.5±39.11	107.8±37.9
Triglycerides (mg/dL)	191.8±19.7	179.8±11.4	185.8±15.6

This study has similar results shown by Greenlund et al (1999) where it was 25%. In comparison to Europeans, south Asians have higher prevalence of hypertension, diabetes mellitus and dyslipidemia. The prevalence of metabolic syndrome is more common in female, which increased with age. Gender difference in the prevalence of the metabolic syndrome with age may be related to the higher prevalence of abdominal obesity and prominence of weight gain associated with increase of age in woman.

Table-II: Percent of categorical variables in patients with hypertension

Variables	Men	Women	Total
Number	212	110	322
Sedentary occupation	59.1	63.3	61.2
Smoker			
Ex	29.6	0.2	14.9
Current	20.5	0.7	10.6
Chewing tobacco user			
Ex	5	4.2	4.6
Current	9.7	20.5	15.1
Alcohol drinker	1.4	0	1.4
Medication for			
Hypertension	64.5	69.7	67.1
Diabetes	11.7	11.2	11.45

Tobacco consumption was found to be a significant independent risk factor for metabolic syndrome in both men and women. Furthermore, tobacco is known to impair insulin action and may lead to insulin resistance (Kong et al., 2001). Cigarette smoking may also induce an increased abdominal obesity, as well as causing hypertension by increasing sympathetic activity. It may elevate triglyceride and lower HDL. (31.8% vs 8%) (McKeigue 1996) in this study. 37.9% had higher waist circumference, 54.3% had higher TG and 69.8% had decreased HDL which is much higher than normal population.

Table-III: Rate of metabolic factors in patients with Essential hypertension

Age	Waist	Low HDL	High TG	High	All	Total
Men						
20-29	0.0	60.8	68.7	16.5	0.0	31
30-39	3.6	50.2	60.1	18.9	2.3	33
40-49	6.2	46.3	58.1	26.4	0.7	41
50-59	6.1	49.0	57.0	31.9	1.1	39
60-69	6.8	45.1	54.1	45.1	1.8	42
70-79	3.1	48.1	37.3	36.2	1.9	26
20-79	5.2	47.2	55.3	31.1	1.5	212
Women						
20-29	64.1	94.6	51.0	17.9	4.7	19
30-39	79.9	90.4	35.6	22.9	6.8	18
40-49	81.3	93.4	57.3	37.1	16.2	24
50-59	79.3	90.9	53.1	33.9	14.7	15
60-69	71.1	92.1	60.9	44.8	21.7	16
70-79	44.7	90.6	59.3	24.0	8.4	18
20-79	78.1	91.3	53.9	31.8	13.9	110
Men and Women						
20-29	24.0	76.0	61.8	16.9	1.9	54
30-39	51.5	76.2	49.8	22.3	5.3	52
40-49	43.8	70.2	59.2	32.8	8.9	49
50-59	35.1	67.1	57.3	33.1	6.5	43
60-69	32.6	64.3	58.1	45.6	9.5	51
70-79	13.1	59.7	44.1	33.2	2.1	73
20-79	37.9	69.8	54.3	31.8	6.5	322

South Asians living in urban society have higher prevalence of many of the complications of obesity than other ethnic groups (Zaman et al., 2006). These complications are associated with abdominal fat distribution that is markedly higher. These findings lead to assumption that there may be genetic susceptibility for development of metabolic syndrome in Bangladeshi people. Unhealthy lifestyles such as low level of physical activity, tobacco consumption, fatty, salty and sugary diets are the environmental factors.

Conclusion

The metabolic syndrome is common association in hypertensive patients. Hypertensive patients with the metabolic syndrome are at increased risk of coronary and cerebrovascular disease and require a more vigorous non-drug preventive approach. The present finding strongly indicates the need for metabolic screening in all hypertensive patients at the first diagnosis.

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