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Health Assessment among the General People of Khulna Division in Bangladesh- A pilot study

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Abstract

Selecting healthy control for any research has become a serious problem in developing countries. General populations are usually unaware of their health condition and progress towards abnormal complication(s) unknowingly.

The present study was aimed to estimate health status in the general population of Khulna division in Bangladesh.
Purposely adult subjects were selected who were above 30 years and free from any known ailment. Both anthropometric and biochemical parameters were measured and calculated by standard procedures.
Health screening of the population indicated that a substantial number of subjects were suffering from undiagnosed hyperglycemia, hyperlipidemia (triglyceride, cholesterol and low density lipoprotein), and abnormal level of high density lipoprotein, creatinine and serum glutamate-pyruvate transaminase.
A considerable number of subjects were found to be underweight, overweight or obese. The ratio of abnormality was higher in female compared to its male counterpart.

***Key Words*:** Healthy survey, blood glucose, lipids

Introduction

Developing countries have always lacked in sustaining routine health check in general population. The prevalence of non-communicable diseases (NCDs), such as heart disease, stroke, cancer, chronic kidney diseases, and diabetes mellitus, has been increasing rapidly worldwide. The World Health Organization (WHO) reported that NCDs accounted for 63% (36 million) of the 57 million global deaths in 2008 and approximately 80% of all NCD related deaths occurred in low and middle income countries [1] where 29% of the deaths occurred in the younger age group (in people aged <60 years) [2].

Many studies done previously in Bangladesh suggested that a lot of populations are suffering from diabetes, obesity, lipid abnormalities and other metabolic related disorders [3-10]. These disorders among general population may lead to the development of metabolic syndrome (MS). MS is a disorder diagnosed by a co-occurrence of three out of five of the following medical conditions: abdominal (central) obesity, elevated blood pressure, elevated fasting plasma glucose, high serum triglycerides, and low high-density lipoprotein (HDL) levels. People who are unaware of the presence of MS may already be progressing towards complications of this condition. MS may increase the risk for coronary artery disease, stroke, and diabetes [11, 12].
Undiagnosed metabolic disorders may also impose substantial public health implications because

these subjects remain untreated and at risk for complications [13]. Very recently a research group from Japan has done an electronic health review and found that obesity and hypertension are very high among the general population of Bangladesh [14]. However, no studies were available citing the true scenario of health status in general Bangladeshi population. Since no data are available on health survey, this study was designed to determine the average health status among Bangladeshi adult populations.

Methods

Briefly, 183 people aged 30 years and over, living in Khulna division, were selected for this cross sectional observation study. Only those subjects were included who did not report of having any chronic or acute illness according to a physician diagnosis and were not currently taking any medicine.

Personal contact through different health organizations was important for the recruitment of the subjects. Those who participated were asked to inform other family members and friends. Subjects were interviewed privately, face to face, by trained interviewers using questionnaires. Additional information regarding age, gender, education, marital status, and employment history was obtained with questionnaires.

Blood pressure was measured by using a standard mercury sphygmomanometer. Weight, height, waist and hip circumference were measured according to standard protocol. Body mass index (BMI) and waist-hip ratio (WHR) was calculated [15, 16]. Blood samples were drawn from all subjects between 8:00 and 9:00 a.m. after 8 to 12 hours of overnight fasting and all blood analyses were done at the research laboratory on the day of blood collection, using the Auto-analyzer (Hitachi 704, Hitachi Ltd., Tokyo, Japan).

Blood glucose (both fasting and after glucose) was measured by the enzymatic colorimetric method using glucose oxidase. For oral glucose tolerant test (OGTT), 75 g of glucose was

administrated orally and blood was collected 2 hours later. Serum total cholesterol and triglyceride concentration were measured by commercially available enzymatic reagents adapted to the Auto-analyzer. HDL cholesterol was measured after precipitation of the apolipoprotein B-containing lipoproteins with phosphotungstic acid. LDL cholesterol was calculated according to modified Friedewald method [17] and it was not calculated when the serum concentration of triglyceride was >400 mg/dL.

Results

Distribution of the study subjects

The total 183 subjects were divided based on gender, where 117 (63.9%) were male and 66 (36.1%) were female participants (Table 1).

Table 1: Distribution of total study subjects based on gender

Subjects	Number (Percentage)
Total Subjects	183 (100.0)
Male	117 (63.9)
Female	66 (36.1)

Mean distribution of the anthropometric parameters subjects

The mean age of the study subjects was 42.8±11.5. Average height and weight were 160.5±10.8 and 62.9±11.5 respectively. The BMI was calculated and the mean was 24.5±4.0. Waist and hip circumference were 86.7±10.7 and 95.2±8.3 respectively. The average waist hip ratio was 0.91±0.06 among the study subjects. Mean of systolic and diastolic blood pressure were110±11 and 73±10 respectively (Table 2).

Mean distribution of the biochemical parameters subjects:

Mean with standard deviation of the biochemical parameters were calculated among the study subjects, fasting glucose was 5.5±2.2, 2 hours after 75 gram glucose intake value was 7.8±4.4.

Lipid status was 184±151, 189±44, 38±8 and 114±31 respectively for TG, cholesterol, HDL and LDL. Creatinine was 0.99±0.16 and SGPT was 30.4±18.2 among the study subjects (Table 3).

Table 2: Mean of the anthropometric parameters in the study subjects

Variables	Mean±SD
Age	42.8±11.5
Height	160.5±10.8
Weight	62.9±11.5
BMI	24.5±4.0
WC	86.7±10.7
HC	95.2±8.3
WHR	0.91±0.06
SBP	110±11
DBP	73±10

BMI, body mass index; WC, waist circumference; HC, hip circumference; SBP, systolic blood pressure; DBP, diastolic blood pressure; WHR, waist hip ratio

Table 3. Mean of the biochemical parameters in the study subjects

Variables	Mean±SD
FG	5.5±2.2
AG	7.8±4.4
TG	184±151
Chol	189±44
HDL	38±8
LDL	114±31
Creat	0.99±0.16
SGPT	30.4±18.2

FG, fasting glucose; AG, after 75gm glucose intake; TG, Triglyceride; Chol, cholesterol; HDL, high density lipoprotein; LDL, low density lipoprotein; Creat, Creatinine; SGPT, serum glutamate-pyruvate transaminase

Prevalence of glycemic status:

Among 183 subjects, 26 were newly diabetic or undiagnosed diabetes which was 14.2 % of population. 25 (13.7%) and 6 (3.3%) subjects were with impaired glucose tolerance (IGT) and impaired fasting glucose (IFG) respectively. Only 68.9 % among the total subjects was normal in glucose tolerance test (Table 4).

Table 4: Distribution of total study subjects based on the glucose cutoff values

Glucose Cutoff	Number (Percentage)
NGT	126 (68.9)
IFG	6 (3.3)
IGT	25 (13.7)
T2D	26 (14.2)

NGT, normal glucose tolerant; IFG, impaired fasting glucose; IGT, impaired glucose tolerant; T2DM, type 2 diabetes
Cut-off values, NGT, fasting glucose (FG) < 5.6 and 2 hours post glucose (2h-PG) <7.7 mmol/l; IFG, FG 5.6 to 6.9 and 2h-PG <7.7 mmol/l; IGT, FG <5.6 mmol/l and 2h-PG 7.7 to 11.0 and; and T2D, FPG ≥ 7.0 or 2h-PG ≥ 11.1 mmol/l .

Prevalence of central obesity based on BMI among the study subjects

Among the total subjects only 6.8% male were found to be underweight, 41.0% with overweight and 12% were obese subjects. However, female were 45.5% overweight and 33.3% obese and nobody was underweight (Table 5).

Table 5: Gender wise distribution of obesity based on cutoff value of BMI as marker

Variables	Male	Female
BMI		
Underweight	8 (6.8)	-
Normal	47 (40.2)	14 (21.2)
Over weight	48 (41.0)	30 (45.5)
Obese	14 (12.0)	22 (33.3)

Cut-off value as Underweight<18.5, normal weight 18.5-22.9, overweight 23-27.5 and obese≥ 27.5 were defined as per WHO guidelines for Asian population (WHO 2004)

Lipid status of the study subjects:

The lipid status of the study subjects were divided between male and female with the standard cut-off value designated for Asian population. Among the total subjects hypertriglyceridemia was 41% in male 40.9% in female subjects. Total cholesterol was borderline high in 18.8% vs 25.8% and high in 8.5% vs 9.1% respectively in male vs female subjects. High density lipoprotein (HDL) was abnormally lower than the cut-off value in a large population, where 68.4% and 90.9% had abnormal HDL in male and female subjects respectively. Females were found have high abnormal low density lipoprotein with 24.2% with borderline high, 3.0% with high and 4.5% with very high level, also in males 17.1%, 6.8% and 1.7% had abnormal LDL respectively (Table 6).

Table 6: Gender wise distribution of the subjects based on cutoff value of Lipid status

Variables	Male	Female
TG (mg/dL)	117 (100.0)	66 (100.0)
Normal (<150)	69 (59.0)	39 (59.1)
High (>150)	48 (41.0)	27 (40.9)
Cholesterol (mg/dL)		
Desirable (<200)	85 (72.6)	43 (65.2)
Borderline high (200-239)	22 (18.8)	17 (25.8)
High (>240)	10 (8.5)	6 (9.1)
HDL (mg/dL)		
Normal (>40)	37 (31.6)	6 (9.1)
Low (<40)	80 (68.4)	60 (90.9)
LDL(mg/dL)		
Optimal (<100)	48 (41.0)	23 (34.8)
Above optimal (100-129)	39 (33.3)	22 (33.3)
Borderline high (130-159)	20 (17.1)	16 (24.2)
High (160-189)	8 (6.8)	2 (3.0)
Very high (>190)	2 (1.7)	3 (4.5)

Creatinine and SGPT level in the subjects:

SGPT was high in 18.8% and 3% however creatinine was high in 6.0% and 6.1% respectively in male and female subjects among the total study population (Table 7).

Table 7: Gender wise distribution of the subjects based on cutoff value of SGPT and creatinine

Variables	Male	Female
SGPT (U/L)		
Expected SGPT (0-45)	95 (81.2)	64 (97.0)
High (>45)	22 (18.8)	2 (3.0)
Creatinine (mmol/L)		
Normal (0.6 to 1.2)	110 (94.0)	62 (93.9)
abnormal (>1.2)	7 (6.0)	4 (6.1)

Discussion and conclusion

Undiagnosed metabolic disorders are reported to be as prevalent as or even more prevalent than diagnosed disease [18, 19]. Although there is increased awareness of health check up in developed countries population with improvement of education and access to medical care, but this was not sufficient in the developing or under developed countries to decrease the percent of undiagnosed cases.

This study revealed that healthy control subjects came out with serious risk factor of metabolic syndrome. Women were found to be at higher risk in all conditions of metabolic disorders. Detection of diabetes among the general community should be considered a priority so that early intervention can prevent, reverse, halt or slow the progression of complications. Further studies on high scale population may give an exact idea about the health condition of general people of developing countries.

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