

Non-Communicable Disease and Health Hazards in Bengali Population: A Major Public Health Issue in India

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ABSTRACT Health policy of a nation is necessary to avoid the health hazards of the people of the nation. Obesity related non-communicable disease is considerably associated with high accumulation of calorie and uneven or less expenditure of calorie due to inadequate physical activity. Obesity could be related with many non-communicable diseases — Hypertension, Coronary Heart Disease (CHD), and NIDDM for example. The main objective of the present study is to estimate the prevalence of over weight and obesity in the Bengali population and its association with few body compositional variables, physiological variables and risk score of coronary heart disease (CHD). Mean age in male was 48.99 yrs and in 46.06 years in female, significant sex difference was seen ($P < 0.05$) in weight, BMI, Heart disease risk score, WHR, PBF, FM and FFM. Fat mass in kg was found to be higher in female than male but risk score of CHD was seen higher in male than female, life style factor may be the one of the reasons. Considering the BMI cutoff value, In case of male 41.84% and 48.14% were seen obese. Again considering the hypertension, in case of male 25% and 19% in female were seen hypertensive. Total risk score (TRS) gave significant correlation with BMI, Blood pressure and PBF. However, PBF was significantly correlated with BMI, WHR, TRS and blood pressure. The present study demonstrated that obesity is one of the major factors for hypertension and Coronary heart disease. Obesity and other lifestyle factor increase the risk of coronary heart disease. Low calorie diet and proper physical activity might be reduce the risk of CHD in Bengali population.

INTRODUCTION

Health policy of a nation is very much important to avoid the health hazards of the people of the nation. There is correct dosage of medicine for treating an illness, but there is a correct dosage of physical activity for promoting health benefits. Contemporary medical technology is developed to a great extent and increase the life expectancy of the people. Now medical technology developed largely and increases the life expectancy of the people by introducing life saving drugs and modern gadgets. Obesity is a great threat to us. In the present day, we are far behind from vigorous activity and mainly due to uneven expenditure of calorie obesity developed. Obesity may be one of the major factors for non-communicable diseases such as Hypertension, coronary heart disease, and NIDDM (ECVDS 2005; Al-Hazza et al. 2002; Baumgartner et al. 1989; Bose et al. 2003; Burger et al. 2004; Chumlea et al. 1986; Corbin et al. 2000; Farquhar et al. 1988). Indians are 50% to 100% susceptible in Coronary Heart Disease (CHD) than the Americans. The major

identified risk factor for CHD is Obesity which can be measured by anthropometric variables.* In addition, Obesity associated with Smoking, hypertension, stress and diet. Hypertension could be increased as a result of Obesity and leads towards CHD. CHD among the Indians prevails from less than 40 years. CHD is a complex trait, with additive effect of genetic and other factors. Considering Indians Coronary artery disease (CAD) is 50% to 100% higher than the Americans are. The average age of first sign of heart disease among Indians varies from below 40 years. The major risk factors are smoking, hypertension, stress, obesity, and others. There is correct dosage of medicine for treating an illness, but there is a correct dosage of physical activity for promoting health benefits and developing physical fitness (Kopelman et al. 2000; Shephard et al. 1991; Hu et al. 2005; Blaxter et al. 1990; Gutin et al. 2007)

Objective

The main objective of the present study is to estimate the prevalence of over weight and

obesity in the Bengali population and its association with few body compositional variables, physiological variables and risk score of coronary heart disease (CHD).

MATERIAL AND METHOD

249 adult individual including 141 male and 108 female were considered here. Measurements were taken from a health awareness fare from Bally, Howrah. Anthropometric measurements and Blood pressure (Systolic blood pressure- SBP and Diastolic blood pressure- DBP) were taken following the standard protocol (Lohman et al., 1988). All individuals are free from any disease, male are service holder but female are all housewife and all of them did not involved in any vigorous activity. The subjects were free from any disease and did not involve in any vigorous activity. Each individual were asked with a specially prepared and pre-tested heart disease risk factor questionnaire along with his or her socio-biological information. Body mass index (BMI), Waist hip ratio (WHR) Waist stature ratio (WSR) was computed following the standard equations.

BMI = Weight (kg) / Height (m²)

WHR = Waist circumference (cm) / Hip circumference (cm)

WSR = Waist circumference (cm) / Height (cm)

Assessment of body composition done taking the PBF (Percent of body fat) using bioelectrical impedance analysis (OMRON HBF-300, OMRON Corporation, Tokyo, Japan). Heart disease risk score (Unalterable risk score- URS, Alterable risk score- ARS, Total risk score- TRS) were calculated using the standard questionnaire (Corbin et al. 2000). Data were analyzed using the SPSS (Version- 10.0).

RESULTS

Mean age in male was 48.99 yrs and in 46.06 years in female, significant sex difference was

seen ($P < 0.05$) in weight, BMI, Heart disease risk score, WHR, PBF, FM and FFM. Fat mass in kg was found to be higher in female than male but risk score of CHD was seen higher in male than female, life style factor may be the one of the reasons (Table 1). Considering the BMI cutoff value, In case of male 41.84% and 48.14% were seen obese (Table 2). Again considering the hypertension, In case of male 25% and 19% in female were seen hypertensive (Table 3). Total risk score (TRS) gave significant correlation with BMI, Blood pressure and PBF (Table 4). However, PBF was significantly correlated with BMI, WHR, TRS and blood pressure. Considering the correlation matrix significant correlation is seen between BMI, TRS, PBF, WHR and SBP in both sexes.

Table 1: Variables with their mean and SD of the studied population.

Variables	Male		Female	
	Mean	SD	Mean	SD
Height	164.92	6.92	150.80	13.53
Age	48.99	14.92	43.06	13.42
Weight	64.96	12.90	59.30	13.24
BMI	23.67	4.05	25.49	5.71
WHR	0.899	0.059	0.866	0.077
WC	83.56	10.76	84.69	11.83
WSR	0.512	0.060	0.556	0.075
URS	7.46	1.52	5.09	1.43
ARS	15.56	2.44	14.69	2.18
TRS	22.89	3.18	19.77	2.18
SBP	126.74	17.72	122.36	14.66
DBP	79.24	10.86	79.90	8.85
PBF	26.33	6.24	34.08	7.51

Table 2: Analysis of BMI with in the population

	Malnourished <18.5	Normal 18.5 ≤ < 25	Obese ≥ 25
Male	16	66	59
Female	8	48	52
N, Male= 141 Female=108		P < 0.05	

DISCUSSION

In un alterable risk score both the sexes are in the more or less in the same position but in

Table 3: Analysis of blood pressure with in the population

Type	Range		Systolic BP (SBP)		Diastolic BP (DBP)	
	SBP	DBP	Male	Female	Male	Female
Low	<120	<80	35	37	39	30
Normal	<130	<85	41	32	64	56
High normal	130-139	85-89	25	17	0	0
Stage I hypertension	140-159	90-99	33	19	32	18
Stage II hypertension	160-179	100-109	06	03	03	03
Stage III hypertension	≥180	≥110	01	0	03	01

Table 4: Analysis of risk score with in the population

Rating	Range	Unalterable risk score		Range	Alterable risk score		Range	Total risk score	
		Male	Female		Male	Female		Male	Female
Very High	9 & above	21	01	21 & above	05	01	31 & above	03	0
High	7-8	87	16	15-20	86	60	26-30	18	03
Average	5-6	31	50	11-14	48	45	16-25	120	97
Low	4 or less	02	41	10 or less	02	02	15 or less	0	08

N, Male= 141, Female=108 Unalterable: P<0.05; Alterable: P>0.05; Total: P>0.05

Male: Correlation Matrix

	Age	BMI	WHR	TRS	SBP	PBF	WSR
Age	1.000	-0.132	0.029	0.599**	0.341**	0.293**	0.097
BMI	-0.132	1.000	0.419**	0.303**	0.185**	0.662**	0.546**
WHR	0.029	0.419**	1.000	0.198*	0.110	0.321**	0.609**
TRS	0.599**	0.303**	0.198*	1.000	0.592**	0.543**	0.343**
SBP	0.341**	0.185*	0.110	0.592**	1.000	0.385**	0.257**
PBF	0.293**	0.662**	0.321**	0.543**	0.385**	1.000	0.594**
WSR	0.097	0.546**	0.609**	0.343**	0.257**	0.594**	1.000

**Correlation is significant at the 0.01 level (2 tailed)

*Correlation is significant at the 0.01 level (2 tailed)

Female: Correlation Matrix

	Age	BMI	WHR	TRS	SBP	PBF	WSR
Age	1.000	0.062	0.119	0.588**	0.295**	0.286**	0.150
BMI	0.062	1.000	0.303	0.432**	0.236*	0.836**	0.127
WHR	0.119	0.303**	1.000	0.176	-0.091	0.286**	-0.057
TRS	0.588**	0.432**	0.176	1.000	0.507**	0.560**	0.104
SBP	0.295**	0.236*	-0.091	0.507**	1.000	0.299**	-0.081
PBF	0.286**	0.835**	0.284**	0.560**	0.299**	1.000	0.122
WSR	0.150	0.127	-0.058	0.104	-0.081	0.122	1.000

** Correlation is significant at the 0.01 level (2 tailed)

* Correlation is significant at the 0.01 level (2 tailed)

alterable risk score male are positioned in a higher group due to life style factor such as smoking, alcoholism and other factors though female have greater fat deposition in their body, for this reason male belong to a higher group of total risk score. Considering the previous studies it is depicted that deposition of fat and obesity had a significant correlation with chances of CVD (Kopelman 2000; Shephard 1991; Burger et al 2004; Hu et al. 2005). As a result decrease of this alterable risk score can decrease the total risk score of heart disease can be possible. Age is unalterable risk factor so age is significantly correlated with unalterable risk score and total risk score. The prior studies has shown that PBF, BMI may be the responsible factor of risk of CVD (ECVDS 2005; Chen et al. 2005). Percentage of body fat is high in female so it shows greater BMI in comparison to male. Male show a greater number as hypertensive than the female might be because of stress and other life style factors

(Chatterjee et al. 2005, 2006). Waist stature ratio is another indicator for heart disease and the optimum level is determined 0.48 in both sexes. Both male and female are belongs to higher than optimal level. A simple message that one's waist circumference should not exceed half the stature is recommended for the public. Obesity and other lifestyle factor increase the risk of coronary heart disease. As seen in the European population (Corbin et al. 2000) it can be suggested that low calorie diet and proper physical activity might be reduce the risk of CHD in Bengali population.

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