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Comparative Study on Prevalence of Hypertension and Diabetes Mellitus Including Pre-hypertensive and Pre-diabetic Among Military Personnel Working in Chattogram Hill Tracts and Chattogram Plain Land Area

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ABSTRACT

Background: *Hypertension and diabetes mellitus are growing problems in Bangladesh. Although some important studies on hypertension and diabetes have been carried out in Bangladesh, study on prevalence of diabetes mellitus and hypertension and the associated risk factors in military personnel are insufficient. We studied to determine the prevalence and some of the risk factors associated with hypertension and diabetes mellitus among the army personnel in Bangladesh and also to conduct a comparative study on the prevalence of the diseases between military personnel deployed in Chattogram plain land and hill tracts area.* **Materials and methods:** *The study was a cross sectional study. The survey was conducted among 265 army personnel of Chattogram plain land and hill tracts area. Data were collected by interview using a semi-structured questionnaire. The difference of prevalence value of hypertension and diabetes mellitus was examined among military personnel working in hill tracts and Chattogram cantonment.* **Results:** *The study found that the overall prevalence of hypertensionin Chattogram plain land unit and hill tracts unit were 23.7% and 4.6% respectively and diabetes mellitus were 4.4% and 1.48% respectively. The prevalence of pre-hypertension and pre-diabetes was 50.37% & 34.6% and 44.4% and 23.1% in the Chattogram plain land unit and hill tracts unitrespectively.* **Conclusion:** *The appropriate health program needs to be implemented withproper strategies including awareness at alllevel for life style modification, intervention by screening, risk group stratification and continued care and follow up.*

Key words: Hypertension; Diabetes mellitus; Army personnel; Chattogram plain land; Hill tracts area, Bangladesh.

Introduction

Hypertension is one of the major Non-Communicable Diseases (NCDs) in the world, which significantly contributes to the burden of Cardiovascular Diseases (CVDs) stroke, kidney failure, disability and premature death. According to the World Health Organization (WHO) about 17 million deaths occur worldwide due to CVDs, of which hypertension alone accounts for 9.4 million deaths, and 80 % of the CVD-related deaths occurred in the developing countries[1]. NCDs are global threat to human health and the development and economy in low-income countries[2]. Diabetes is now recognized as a major chronic public health problem throughout the world and affecting a large number of people in a wide range of ethnic and economic levels in both developed and developing countries[3]. Raised Blood Pressure (BP) is the largest contributor to the global burden of disease and mortality, leading to approximately 9.4 million deaths annually[4]. Developing countries like Bangladesh are facing a higher burden of non-communicable diseases such as hypertension as a result of demographic transition. The Government of Bangladesh is constitutionally committed to providing health care to every citizen that includes health services, health education, health promotion and rehabilitation[5]. We know that the success in prevention depends on various factors, including magnitude of the diseases burden , awareness on the risk factors and causes of diseases, the ways of their transmission, identifying risk factors and people at risk, availability of preventive, early detection or treatment measures of diseases, appropriate organization for implementing these measures for related individuals groups, and continuous evaluation and development of methods employed[6]. Awareness regarding risk factors is a prerequisite for the prevention of diabetes in general population[3]. The purpose of this study was to assess the prevalence of hypertension and diabetes mellitus in military personnel working in Chattogram plain land and hill tracts area and also to compare the prevalence of the diseases between the two groups of soldiers.

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Materials and methods

For collecting primary data, one Chattogram plain unit and one hill tracts unit were selected for the study. The plain land unit is located at Chattogram Cantonment in Bayezid thana and hill tracts unit is situated in Mohalchari of Khagrachari district.To achieve the research objectives attempts were made to collect both qualitative and quantitative

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data by collecting data from the study units. Besides this, interview and observation methods were applied to understand the exact situation. Among the 265 samples135 samples were from Chattogram plain land unit and 130 from hill tracts unit. The study was a cross sectional study. Data were collected by interview using a semi structured questionnaire during the period of August 2015 to November 2015. Blood pressure was measured to confirm hypertension, fasting blood sample was tested for blood sugar to detect diabetes mellitus, and height and weight were measured to find out BMI. Statistical analysis was carried out by using SPSS version 22.

Participants were categorized as normal, pre-diabetes and diabetic basing on their fasting blood glucose level. Fasting Blood Sugar (FBS) ranges considered in the study are as follows: normal{3.9 to 5.4 mmol/L (70 to 99 mg/dl)}, Prediabetes or Impaired Glucose Tolerance {5.5 to 6.9 mmol/L (100 to 125 mg/dl)} and diabetic {7.0 mmol/L (126 mg/dl) or above}[7]. Normal Blood Pressure (BP) value considered in the study as under: normal is less than 120/80 mm Hg, elevated- Systolic between 120-129 and diastolic more than 80, Stage 1 hypertension (Pre hypertension) is systolic between 130-139 or diastolic between 80-89 and stage 2 hypertension: Systolic at least 140 or diastolic at least 90 mm Hg[8]. Body Mass Index (BMI) less than 18.5 was considered under weight, BMI within 18.5 to 25 was considered normal, BMI within 25.0 to 30 was considered over weight and BMI ≥ 30 was considered obese.

Inclusion criteria

Military personnel of the rank of Lieutenant Colonel and below and age 30 years and above up to retirement age limit were the included in study sample.

Exclusion criteria

Military personnel of the rank of Colonel and above were excluded from the sample.

Ethical clearance was obtained from appropriate individuals and authority

Results

The study found that the overall prevalence of hypertension in Chattogram plain land unit and hill tracts unit were 23.7 % & 4.6 % respectively and diabetes mellitus were 4.4% & 1.48 % respectively. The prevalence of pre-hypertension and pre-diabetes in Chattogram plain land unit and hill tracts unit were 50.37% & 34.6% and 44.4% & 23.1% respectively. The study revealed that 41-45 age group and 36-40 age group are the most affected groups. Proportions of overweight respondents in Chattogram plain land unit and hill tracts unit were 41.48 % & 35.38 % respectively. Mean age of 130 respondents of hill tracts unit was 37.18 years with SD of 4.297 and that of Chattogram plain land unit was 38.17 wit SD of 6.253.

Table I : Distribution of diabetic and pre-diabetic among different age groups of plain land unit

		FBS			Total
		Normal	Prediabetes	Diabetes	
Age	31-35 Year	32 (23.70%)	19 (14%)	0	53
	36-40	20 (14.81%)	14 (10.37%)	2 (1.48%)	36
	41-45	16 (11.85%)	22 (16.3%)	3 (2.2%)	39
	46 and Above	1 (.74%)	5 (3.7%)	1 (.74%)	7
Total		69 (51.2%)	60 (44.4%)	6 (4.4%)	135

The table shows diabetic 4.4% and pre-diabetic 44.4% in the respondents of plain land unit. Age group 41-45 year shows the highest prevalence of prediabetic and diabetic as 16.3% and 2.2 respectively.

Table II. Distribution of diabetic and pre-diabetic among different age groups of hill tracts unit

		FBS			Total
		Normal	Prediabetes	Diabetes	
Age	31-35	36	0	0	44
	36-40	35	2 (1.48%)	0	46
	41-45	22	3 (2.2%)	1 (.76%)	30
	46 and Above	7	1 (.76%)	1 (.76%)	10
Total		100	30 (23%)	2 (1.48%)	130

The table shows the diabetic as 1.48% and pre-diabetic as 23%. Age group 41-45 years shows the highest prevalence of pre-diabetic and diabetic as 23% and 1.48% respectively.

Table III : Comparative distribution of prediabetic and diabetic respondents in Chattogram plain land unit and hill tracts unit.

FBS Status	Frequency with percentage	
	Plain land unit	Hill tract area
Normal	69 (51.1%)	100 (76.9%)
Prediabetes	60 (44.4%)	30 (23.1%)
Diabetes	6 (4.4%)	2(1.48%)
Total	135	130

The table demonstrates comparative state of the Chattogram plain land unit and hill tracts unit with diabetic as 4.4% and 1.48% respectively and pre-diabetic as 44.4% and 23.1% respectively. The difference in the level of fasting blood sugar between the two units was statistically significant (p= 0.04).

Table IV : Distribution of hypertensive and pre-hypertensive (Stage-1 and stage-2 hypertension) among the different age groups of Chattogram plan land unit

		Blood Pressure (BP)				Total 36
		Normal	Elevated	Stage 1 Hypertension	Stage 2 Hypertension	
Age	31-35	10	8	23 (17%)	11 (8.15)	53
	36-40	6	6	16 (11.85%)	5 (3.7%)	36
	41-45	3	2	24 (17.78%)	11 (8.15)	39
	Above 46	0	0	2 (1.48%)	5 (3.7%)	7
Total		19	16	68 (50.37%)	32 (23.7%)	135

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The table shows the prevalence of hypertensive and pre-hypertensiveamong the respondents of Chattogram plan land unit as 23.7% & 50.37% respectively. Age group 41-45 yrs. shows the highest prevalence of hypertension and pre-hypertension as 8.15% & 17.78%.

Table V : Distribution of hypertension and pre-hypertensive (Stage-1 and stage-2 hypertension) among the different age groups of the respondents of hill tracts unit

		BP				Total
		Normal	Elevated	Stage 1 Hypertension	Stage 2 Hypertension	
Age	31-35	23	11	9 (6.9%)	1 (.26%)	44
	36-40	19	7	13 (10%)	2 (1.54%)	46
	41-45	7	7	18 (13.85%)	3 (2.30%)	30
	Above 46	4	1	5 (3.85%)	0	10
Total	53	26	45 (34.6%)	6 (4.6%)	130	

The table shows the prevalence of hypertensive and pre-hypertensive among the respondents of the hill tracts unit as 4.6% and 34.6% respectively. Age group 41-45 years shows the highest prevalence of hypertensive and pre-hypertensive as 2.3% & 13.85% respectively.

Table VI : Comparative distribution of hypertensive and prehypertensive respondents in Chattogram plain land unit and hill tracts unit

BP Status	Frequency with percent	
	Plain land Unit	Hill tractsUnit
Normal	19 (14.1%)	53 (40.8%)
Elevated	16 (11.9%)	26 (20%)
Stage 1 Hypertension	68 (50.4%)	45 (34.6%)
Stage 2 Hypertension	32 (23.7%)	6 (4.6%)
Total	135	130

The table shows hypertensive and prehypertension respondents in Chattogram plan land unit and hill tracts unit as 23.7% and 4.6% respectively. It also shows pre-hypertensive respondents in Chattogram plain land and hill tracts unit as 50.4% and 34.6% respectively. The difference was statistically significant (p value for differencesin systolic pressure was 0.003 and for diastolic pressure was 0.004).

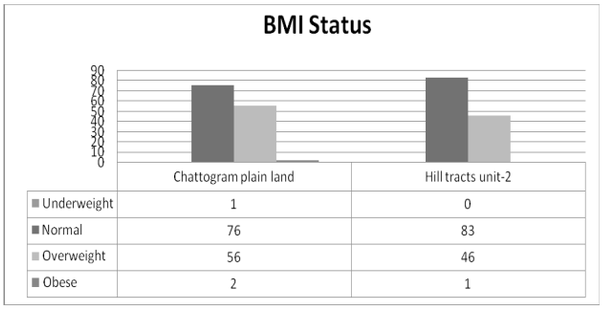

Figure 1 : Presentation of BMI status of the Chattogram plain land unit and hill tracts unit

The figure shows a higher proportions of overweight respondents 56 (42 percent) and obesity 2 (1.48 percent) were from Chattogram plain land unit, 46 (35 percent) overweight and 1 (0.77 percent) obesity respondents were from hill tracts unit.The difference is not statistically significant (p=0.108).

Discussion

The study found that the overall prevalence of hypertension in Chattogram plain land unit and hill tracts unit were 23.7 % & 4.6 % respectively and diabetes mellitus were 4.4% & 1.48 % respectively. It also found the prevalence of pre-hypertensive respondents in Chattogram plain land and hill tracts unit as 50.4% and 34.6% respectively. The study also revealed that the prevalence of pre-diabetic in Chattogram plain land and hill tracts unit as 44.4% and 23.1% respectively. The differences of prevalence of hypertension and diabetes between the two units were found to be statistically significant. Operational duty pattern in hill tracts may be one of the causes of differences. Studies on hypertension and diabetes were conducted by many authors. Actually the impact of hypertension is considerably higher in people with diabetes than it is in the general population, suggesting either an increased sensitivity to its effect or a confounding underlying aetiopathogenic mechanism of hypertension associated with CVD with diabetes[9].

Saquib, N et al assessed the prevalence of type-2 diabetes and metabolic syndrome among the urban middle class in Bangladesh and the result showed that the prevalence of type-2 diabetes and metabolic syndrome among the middle class in Dhaka is alarming high[10]. In low- and middle-income countries, the burden of non-communicable diseases is growing against an existing burden of other disease such as HIV/AIDS[11]. High blood pressure is a key risk factor for many disease, including heart attack and stroke[12]. Diabetes affects both individuals and their families and has an impact on economic and social development of a country. Information on the availability, cost and quality of medical care for diabetes is mostly not amiable for many low- and middle-income countries like Bangladesh[13]. In rural south Asia, hypertension remains a significant public health issue with sub-optimal Blood Pressure (BP) control rates[14]. Social inequalities in chronic disease outcomes differ between industrialized and developing countries, but few have directly compared these effects. There were difference in the patterns of educational health disparity for hypertension and diabetes mellitus[15]. Islam SM et al conducted a cross-sectional survey in Dhaka using multi-stage random sampling and found that the overall age-adjusted prevalence of hypertension and pre-hypertension among 730 participants was 23.7% and 19%, respectively, which was higher among males compared to females[16]. The result is similar to findings of this study with dissimilarities in prehypertensive prevalence. The prevalence of hypertension and prehypertension was 31.9 % and 16.0 % respectively in a study

in 2015 on adults of rural Bangladesh[17]. In a study on Indian population the age-adjusted prevalence in men and women of prehypertension was 40.2% and 30.1%, and of hypertension 32.5% and 30.4%, respectively[18]. Akter S et al. estimated the prevalence of diabetes and Prediabetes and their risk factors among Bangladeshi adults using national survey data and found the overall age-adjusted prevalence of diabetes and pre-diabetes was 9.7% and 23% respectively in contrast to the findings of the present study as 4.4% and 44.4% respectively in this study[19]. Proportions of overweight respondents in Chattogram plain land unit and hill tracts unit were 41.48 % & 35.38 % respectively. A doctoral study by Sanderson PW based on the secondary analysis of data covering 50,000 British Army soldiers indicated that according to BMI, 56.7% of the study population were overweight and of those individuals 12% were obese[20]. In an study by Salimi, Y on Iranian military personnel the prevalence of overweight and obesity was found to be 41% and 13% respectively[21].

Conclusion

The study revealed a high prevalence of hypertension and diabetes including pre-hypertensive and pre-diabetic among military personnel working in Chattogram hill tracts and Chattogram plain land area. The prevalence of both the diseases are significantly higher among military personnel in Chattogram plain than hill tracts.

Recommendations

Appropriate and effective health promotion and prevention programs to be undertaken to promote a healthy lifestyle and to reduce the prevalence of hypertension and diabetes mellitus among army personnel. More studies on army personnel with larger sample size is recommended to explore the burden of hypertension and diabetes mellitus with its overall implications and cost of the burden in terms of finance and operational readiness of the army.

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Discloser

Both the authors declared no competitive interest.

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