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Prevalence of hypertension among adults of Midnapore, West Bengal, India: A comparison between sexes

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ABSTRACT

Present study aims to find out the prevalence of hypotension and hypertension among Bengalee adult males and females of Midnapore, West Bengal, India. A multistage sampling technique was used by a house-to-house survey among 498 (Male=344, Female=154) adult individuals. It was evident from the present result that hypertensive cases were found to be more frequent among males with respect to Systolic Blood Pressure (SBP) and Diastolic Blood Pressure DBP. However, hypotensive cases were found to be more frequent among females, only in DBP. Furthermore, age seems to be a potential risk factor for the development of hypertension in the studied population.

Introduction

Hypertension is a major modifiable risk factor, which significantly and independently increases the risk of developing cardiovascular disease (CV) complications. On the other hand, an effective treatment of hypertension substantially reduces the risk of developing such complications [1]. Although importance of blood pressure as a risk factor in cardiovascular disease is well established [2-4], however, how blood pressure is influenced by different environmental factors is the key for the understanding of coronary diseases. The people of South Asian origin have increased cardiovascular risk due to more centralized deposition of body fat with higher mean of waist circumference (WC) and waist hip ratio (WHR) compared to Europeans [5-7].

Since hypertension is an ideal identifiable target to reduce global cardiovascular risk, it is clear that effective strategies, aimed at improving high BP control in the general population of hypertensive patients, represent a fundamental step of any preventive strategy in our country. Therefore, the purpose of the present study was to screen and identify Bengalee males and females of Midnapore town, West Bengal with elevated blood pressure.

Materials and Methods

The present study was cross-sectional and conducted in Midnapore, West Bengal which is situated about 130 km from Kolkata city, the provincial capital of West Bengal. A total of 498 adults (344 males and 154 females) aged between 18 years and above were measured for blood pressures and pulse rate. This study was carried out during June-July 2012. Data were collected after obtaining the necessary approval from the University authorities. Informed consent was also obtained from each participant. Information on age, gender, blood pressures and pulse rate measurements were collected on a pre-tested questionnaire by house-to-house visit following interview and average of three consecutive measurements (following 2 minutes gap between readings) were recorded. The measurements were taken from the participant during day time.

The physiometric variables included measurement of systolic blood pressure (SBP), diastolic blood pressure (DBP) and pulse rate. Two consecutive readings were recorded for each of SBP and DBP and the averages were used. The measurements were taken with the help of digital blood pressure machine in a sitting position with the left forearm placed horizontal on the table. All efforts were made to minimize the factors which affect blood pressure like anxiety, fear, stress, laughing and recent activity [8]. Mean arterial blood pressure (MAP) was calculated for each of the two readings taken for SBP and DBP by using the formula:

MBP = DBP + (SBP-DBP) / 3 [9]

All data were analyzed by SPSS (Statistical Package for Social Sciences, Version 16). Mean, standard deviation, independent samples t-test, ANOVA (F-test) and Chi-square test (χ^2) were performed to investigate the blood pressure phenotypes among both sexes. Statistical significance was set at 0.05.

Results

Table 1 presents the means, standard deviations and t-test between male and female of the studied variables. Negative significant sex difference in mean age was observed and positive significant sex differences in mean DBP, MAP and pulse rate were observed.

Table 1. Descriptive statistics and t-test among studied community sex specific

Variables	Mean±SD		t-test
	Male (*n*, 344)	Female (*n*, 154)	
Age	33.23±15.30	37.08±16.32	-2.545**
SBP	128.66±63.63	118.69±16.80	1.913
DBP	78.80±13.84	72.57±8.84	5.137***
MAP	95.42±25.20	87.95±9.80	3.562***
Pulse Rate	84.13±14.26	80.51±10.79	2.813**

Mean, standard deviation (in parentheses), t- test and F- test (ANOVA) of the studied variables viz., SBP, DBP, MAP and pulse rate of four different age groups of male and female are presented in Table 2. There existed negative significant sex

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difference in age (t=-2.248; p<0.05) among age group III and positive significant sex difference in SBP (t=2.504; p<0.05) among age group II and (t=4.612; p<0.001) among age group IV. Positive significant sex difference in DBP (t=3.454; p<0.001) among age group I and (t=6.672; p<0.001) among age group IV was also observed. Significant differences in MAP (t=2.655; p<0.01) among age group I, (t=1.989; p<0.05) among age group II (p<0.001) and among age group IV was observed. There existed significant difference in pulse rate (t=2.214; p<0.05) among age group I and (t=4.270; p<0.001) among age group IV. Significant differences in age groups for age (F =1890.33; p < 0.001) among males and (F =394.69; p < 0.001) among female was observed. Significant age group difference was observed for SBP (F =20.05; p < 0.001) among females; DBP among males (F =4.033; p < 0. 01) and females (F =5.69; p < 0.01); MAP among females (F=13.46; p < 0.001); pulse rate among males (F=11.070; p < 0.001) and females (F=3.869; p<0.05).

Table 3 presents the prevalence of hypotension and hypertension of studied subjects using SBD and DBP. For SBP males (0.9 %) were more hypotensive as compared with the females (0.6 %). Similarly males (20.9 %) were more hypertensive as compared to females (8.4 %). For DBP females (9.1 %) were more hypotensive as compared to males (6.4 %). Similarly males (19.2 %) were more hypertensive as compared to their female (5.2 %) counterpart.

Discussion

Hypertension is one of the major public health problems in India and its prevalence is rapidly increasing among both urban and rural populations [10-11].

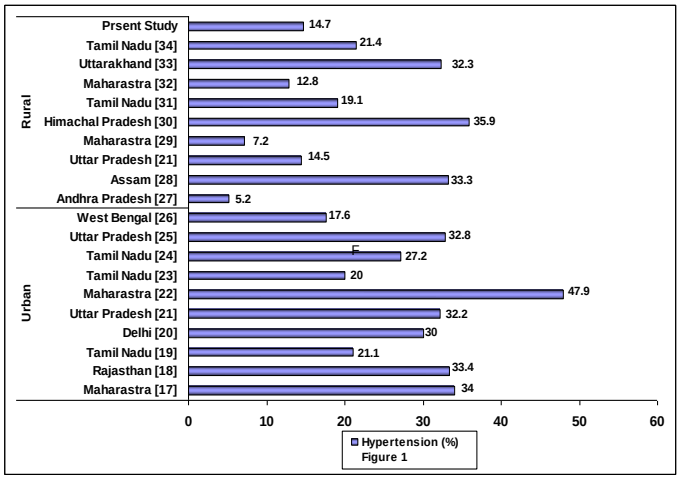

Figure 1. Comparative prevalence of hypertension among adults (Aged ≥ 18 years) in various states of India

Our study documents the high prevalence of hypertension among males (20.9 %) compared to females. The high incidences of hypertension are likely to be important contributors to the epidemic of cardiovascular disease in affluent Indian subjects. The prevalence of hypertension has been increasing in India, both in rural and urban regions [12]. The prevalence of hypertension in urban areas of India ranged from 2.6-5.2 percent during 1960-1980 to an elevated 20-33 per cent in last decade [13-15]. The prevalence of hypertension was significantly higher in males compared with females, possibly due to the increased prevalence of metabolic risk factors for hypertension and pre-hypertension in males. Greenlund et al [16] reported that subjects with pre-hypertension were 1.65 times as likely to have at least 1 other adverse cardiovascular risk factor than those who were normotensive and to have 1.8 times increased risk of cardiovascular events. Prevalence of hypertension using blood pressure among various studied adult population in India is presented in Figure 1. It is clear from the figure that the prevalence of hypertension in urban studies was highest in Maharashtra (47.9 %) [22] and lowest in West Bengal (17.6 %). Similarly, in rural studies Himachal Pradesh adults had highest (35.9 %) [30] and Andhra Pradesh study the lowest (5.2 %) prevalence of hypertension.

The present study is limited by its small sample size, being from single ethnic group of West Bengal, India. These results may therefore only be representative of a particular area and not of the district. To obtain a broader representation, we suggest that more studies involving BP among adults from different parts of India be undertaken.

Conclusion

We conclude that there exists elevated blood pressure among males. This may lead to higher incidences of hypertension- related diseases among them. Since elevated blood pressure is a modifiable variable, appropriate measures including changes in lifestyle are required to prevent hypertension-related ailments. Moreover, similar studies should be undertaken in other regions/ethnic groups in India to prevent the epidemic of hypertension and its related disorders.

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Table 2. Age-sex specific descriptive statistics, t-test and ANOVA of the studied variables

Variables	Sex	Age Group				F
		I (n1=193; n2=68)	II (n1=51; n2=14)	III (n1=24; n2=26)	IV (n1=76; n2=46)	
Age	Male	22.29 (1.57)	32.35 (2.69)	40.96 (2.24)	59.17 (6.92)	1890.33***
	Female	22.13 (1.65)	31.36 (3.08)	42.65 (3.01)	57.78 (9.49)	394.69***
	t-test	0.682	1.190	-2.248*	0.931	
SBP	Male	126.34 (83.40)	124.88 (9.98)	120.25 (27.09)	139.76 (15.82)	1.057
	Female	109.19 (10.32)	117.36 (9.87)	129.12 (25.26)	127.2 (12.01)6	20.05***
	t-test	1.689	2.504*	-1.198	4.612***	
DBP	Male	77.13 (15.58)	80.04 (9.22)	75.88 (13.93)	83.14 (10.41)	4.033**
	Female	70.12 (10.27)	76.50 (6.89)	77.35 (9.14)	72.30 (4.60)	5.69***
	t-test	3.454***	1.335	-0.445	6.672***	
MAP	Male	93.53 (31.76)	94.99 (8.23)	90.67 (17.75)	102.02 (10.96)	2.417
	Female	83.14 (9.34)	90.12 (7.62)	94.60 (12.69)	90.62 (4.60)	13.46***
	t-test	2.655**	1.989*	-0.907	6.697***	
Pulse Rate	Male	87.12 (14.63)	74.88 (16.88)	82.83 (13.61)	83.14 (7.25)	11.070***
	Female	82.93 (9.26)	80.36 (6.67)	81.81 (14.38)	76.24 (10.60)	3.869*
	t-test	2.214*	-1.183	0.258	4.270***	

Table 3. Prevalence of hypotension and hypertension among studied subjects using SBP and DBP

Variable	BP Classification	Sex		χ^2 (p-value)
		Male Frequency (%)	Female Frequency (%)	
SBP	Hypotension	3 (0.9)	1 (0.6)	11.879 (p< 0.01)
	Normal	269 (78.2)	140 (90.9)	
	Hypertension	72 (20.9)	13 (8.4)	
	Total	344 (100)	154 (100)	
DBP	Hypotension	22 (6.4)	14 (9.1)	16.825 (p<0.001)
	Normal	256 (74.4)	132 (85.7)	
	Hypertension	66 (19.2)	8 (5.2)	
	Total	344 (100)	154 (100)	

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