Distribution of blood pressure among men in Eskişehir

Alaettin Ünsal, Mustafa Tozun, Afşin Parspour, Bülent Görenek*, Kazım Tırpan***

From Departments of Public Health and *Cardiology, Medical Faculty, Eskişehir Osmangazi University, Eskişehir
**Directorship of Health of Eskişehir, Eskişehir, Turkey

ABSTRACT

Objective: This study was aimed to investigate distribution of blood pressure (BP) and high BP related to risk factors.

Methods: This study is a cross-sectional. Study was done among over 40 years aged men population in primary care centers of Eskişehir city center. Participants' were 2031 men. Study period was from 1 February to 30 March in 2005. Hypertension was defined according to the recommendations of the Seventh Report of the Joint National Committee (JNC 7). Data were analysed with SPSS for Windows software (version 11.5, Chicago, Il, USA). The Chi-square test, analysis of variance (ANOVA), and logistic regression analysis were used for statistical analyses.

Results: The mean age participants was 61.73±10.24 (range 40-94) years. The mean systolic BP measurement was 135.79±23.41 mmHg and the mean diastolic BP measurement was 80.31±13.45 mm Hg for all participants. High BP was determined in 52.2%. Older age ($p<0.001$), family history of hypertension ($p<0.05$) and obesity ($p<0.05$) were important risk factors for hypertension.

Conclusion: These results suggest that the measure of blood pressure over 40 years aged men population should be performed routinely in primary care centers in Eskişehir city center. *(Anadolu Kardiyol Derg 2007: 7 Suppl 1; 201-5)*

Key words: blood pressure, primary care center, men, age, risk factors

Introduction

Hypertension is defined as mean systolic blood pressure (SBP) ≥140 mm Hg and/or mean diastolic blood pressure (DBP) ≥90 mm Hg and/or current treatment for hypertension with prescription medication (1). Hypertension is an important public health challenge because of its high prevalence in adult population, and it is the reason of very seriously complications and its high mortality (2-4). In various studies, prevalence rates of hypertension in adult population were reported as 3% to 40% (1, 5-7). Hypertension has been shown commonly in over 40 years aged populations and it has been estimated to affect half of over 60 years aged populations. Hypertension has been found in one of five people over 40 years of age population and the prevalence rates of hypertension in adult population varies from 29% to 49% (8, 9). In adult men prevalence rates of hypertension were reported as 15.6%-33.0% (10-13) and prevalence of hypertension in men is higher than in women in Turkey (14, 15).

In developing countries, especially in urban areas, causes of high prevalence of hypertension are rapidly ageing population, economic evaluation, and urbanization and changing life style (16-20). Hypertension is the most important exchangeable risk factor for cardiovascular, cerebrovascular and renal diseases; it is also a major risk factor for cardiovascular mortality, being responsible for 20%-50% of all deaths. Hypertension is responsible for one in eight of deaths in the world and has the third rank among all causes of mortality (5, 21). Cardiovascular diseases are the most important causes of mortality and 40.6% of all causes of mortality in urban area in Turkey (22, 23).

Known risk factors for hypertension are older age, unemployment, low educational level, bad nutrition habits, obesity, smoking, alcohol consumption, stress, diabetes mellitus, nephropathy, family history of hypertension, high total cholesterol and insufficient physical activity (7, 24-27).

This study was aimed to investigate distribution of BP and hypertension related to risk factors (demographic characters, socioeconomic status, and life style, some habits and body mass index) in over 40 years aged men in Eskişehir city center.

Methods

Eskişehir is a province located in the Middle Anatolian Region of Turkey, with a population of 706.430 and city center population of 571.658 (80.9% of population), 284.538 of which are men aged over 40 years, constituting 49.8% of city center population and 48.4% of overall population aged over 40 years) (according to data of Health Department of Eskişehir, 2005).

This study is a cross-sectional. Study period was from 1 February to 30 March in 2005. Participants' were 2031 men with age over 40 years, visited total 19 primary care centers of the Eskişehir city center and accepted in this study. In this study, attendant family physicians have been informed about study aims and methods of BP measurements.

Ethical permission for the study was obtained prior to collecting data, by contacting and receiving approval from the appropriate

Address for Correspondence: Afşin Parspour, MD, Department of Cardiology, Medical Faculty, Eskişehir Osmangazi University, 26040, Meselik, Eskişehir, Turkey
Phone: +90 222 239 29 79 / 4514 Fax: +90 222 229 30 49 E-mail: aparspour@hotmail.com

management authority, the health directorships of the city and district involved. Participants were assured of the confidentiality of their responses and provided informed verbal consent. Assent was obtained from all the participants.

The physician completed a questionnaire, which included the following information obtained from sociodemographic characteristics, and factors related to hypertension.

Sedentary lifestyle was defined as <2 times/week walking (28). A smoker is a person, who smokes any tobacco product at least once a day, and a non-smoker is a person who, at the time of the survey, does not smoke at all (29). An excessive drinker was considered if participants reported a weekly alcohol intake (30). Having excessive salt intake was defined use of extra salt at meals (31). The excessive red meat intake was defined eating three or more servings per week of red meat (32). Having vegetable intake was defined eating vegetables three or more times per day, and having fruit intake was defined eating two or more times per day (33). The used oil types appraised vegetal, animal, and mix (9). Patients were described to have hypercholesterolemia, nephropathy or diabetes if these were noted in their clinical history.

Blood pressure was measured after the participant seated and 5 minutes rest, 2 measurements were taken with an interval of 2 minutes between readings, and the average of the 2 recordings was calculated. The BP was measured by aneroid sphygmomanometers (3).

High BP was defined ≥140/90 mm Hg (≥130/80 mm Hg in diabetics) and the JNC 7 classification of hypertension was used. By JNC 7, "Normal" BP is defined as SBP<120mmHg and DBP <80 mm Hg. "Prehypertension" is defined as SBP 120 to 139 mmHg or DBP 80 to 89 mm Hg. "Stage I hypertension, (SI)" is defined as SBP 140-159 mmHg or DBP 90-99 mm Hg. "Stage II hypertension, (SII)" is defined as SBP≥160 mmHg or DBP≥100mm Hg. "Isolated systolic hypertension, (ISH)" is defined as SBP≥140 mmHg and DBP <90mm Hg and "Isolated diastolic hypertension, (IDH)" is defined as SBP<140 and DBP≥90mm Hg (4). Height measure was performed with measuring tape, weight measures with home type of weight bridge. Patients were considered as obese if they had a body mass index (BMI) of 30 kg/m^2 or more (3).

Awareness of hypertension was defined as any prior diagnosis of hypertension by a health care professional. Treatment of hypertension was defined as a self-reported use of pharmacological medication for the management of high BP within the 2 weeks preceding the participant's interview and control of hypertension was defined as having an average SBP less than 140 mmHg and an average DBP less than 90 mmHg in the context of pharmacological treatment of hypertension (<130/80 mm Hg in diabetic patients) (34).

Statistical analysis was made with SPSS for Windows software (version 11.5, Chicago, Il, USA). Comparison between means was done with the Student t test for independent data. Comparison between groups was done with the Analysis of Variance (ANOVA). The possible association between qualitative variables was measured with the Chi square test. Values were considered to be statistically significant if the $p<0.05$. The 95% confidence interval (CI) was calculated for the variables of interest, which were assumed to be normal. Multivariate analysis (Stepwise Backward Wald Regression) included the candidate variables related to hypertension for the model. Goodness of fit was calculated with the Hosmer-Lemeshow c statistic.

Results

The mean age of 2031 men was 61.73±10.24 (range 40-94) years. The mean SBP was 135.79±23.41 mmHg and the mean DBP was 80.31±13.45 mmHg. Table 1 shows the distribution of systolic and diastolic blood pressures according to age groups.

High BP was determined in 52.2% (1060 persons). Prevalence of family history of hypertension was 38.1%, the mean BMI was 26.39±3.56 and prevalence of obesity (≥30 kg/m^2) was 14.2%. Table 2 shows that the association of some variables (age groups, smoking, alcohol, insurance, educational level, occupation, BMI, diabetes, nephropathy, hypercholesterolemia, family history of hypertension, supplement salt to meal, intake of animal oil, consumption vegetables and fruits and physical activity) with high BP in logistic model.

By JNC7 (3), distributions of BP were determined in 17.1% as "Normal", 30.6% as prehypertension, 29.0% as SI, 23.2% as SII, 21.5% as ISH and 5.5% as IDH. Table 3 shows those types of hypertension and the mean of ages in study group.

In a study group, awareness for hypertension was determined in 64.8%. Furthermore, 48.7% of the hypertensive individuals were treated with antihypertensive medication, and 7.2% of these had adequate BP control in treated group. Table 4 shows the awareness, treatment and control of hypertension compared by age.

Discussion

There are limited number of studies on distribution of BP and risk factors of hypertension in men. Setiati and Sutrisna (14) and Lamoyin et al. (15) reported that male gender as a risk factor for hypertension.

In this study, we found measures of SBP and DBP coincided with the increase in age in men ($p_{systolic}$ <0.001, $p_{diastolic}$ <0.001).

Table 1. Distribution of systolic and diastolic blood pressures according to age groups

Systolic blood pressure, mm Hg[a]			Diastolic blood pressure, mm Hg[b]		
Age groups	n	Mean±SD	95%CI	Mean±SD	95%CI
40-49 years	244	125.71±19.57	123.25-128.19	77.75±13.40	76.06-79.44
50-59 years	601	132.84±22.61	131.03-134.65	80.11±12.99	79.07-81.15
60-69 years	660	137.25±23.45	135.46-139.04	80.14±13.85	79.09-81.20
≥70 years	526	142.02±23.82	139.97-144.06	81.92±13.28	80.78-83.06
Total	2031	135.79±23.41	134.77-136.81	80.31±13.45	79.72-80.89

a - Variance analysis (ANOVA) for the mean SBP F=33.001, df=3, p=0.000.
b - Variance analysis (ANOVA) for the mean DBP F=5.589, df=3, p=0.000.
CI- confidence interval, DBP- diastolic blood pressure, SBP- systolic blood pressure, SD- standard deviation

Singh et al. (35) reported similar with our study results. Over 70 aged group was an important risk factor for hypertension (p<0.001). Results of our study and in agreement with ther studies (10, 11, 18, 19).

Some studies (7, 9, 36) reported that prevalence of hypertension decreases with increasing of educational level, while other studies (17, 20) reported that increase in prevalence of hypertension was parallel with increase in educational level. Our study showed that low educational level was not an important risk factor for hypertension in this study (p>0.05).

Several studies (16, 25, 37) found an inverse association of socioeconomic status with BP, although absence of insurance was not an important risk factor in our study (p>0.05).

It was suggested (17, 38, 39) that smokers had lower BP levels. Controversially, we could not find any relation between smoking and hypertension (p>0.05). Lamoyin et al. (15) could not find any relation between alcohol consumption and hypertension. We also did not reveal any relation between alcohol consumption and hypertension, either. However, some studies (39-41) reported alcohol consumption was an important risk factor for hypertension.

In this study we could not find any relation between regular physical activity and BP (p>0.05). A study by Hypertension Study Group (17) reported a negative association between regular physical activity and BP. Controversially, some studies (9, 27, 25) reported a positive association between regular physical activity and BP.

A positive association between salt supplementation, animal oil and BP has been shown in some studies (7, 9, 16, 35, 41). However, we could not find any association between salt supplementation, animal oil and BP (p>0.05).

In our study, family history of hypertension was an important risk factor for hypertension (p=0.014) which is in accordance with previous investigations (7, 16, 36, 41). We could not find any association between diabetes mellitus, nephropathy, hypercholesterolemia and hypertension (p>0.05), although.

Several investigation (17, 27, 36) described high prevalence of hypertension in patients with diabetes mellitus or hypercholesterolemia. In our study we found that obesity was an important risk factor for hypertension (p=0.007) and thus confirmed previously reported findings (10, 15-18, 35).

There was a positive association between hypertension types and age groups (p<0.001) in our study. We found that ratios of normotensive (X^2=28.578; p=0.000), prehypertensive (X^2=24.340; p=0.000) and IDH (X^2=11.285; p=0.002) measures decrease by age.

Table 2. Association of variables with high blood pressure in logistic model

Step 11	B	Wald	df	p	OR	95% CI
Age groups						
40-49 years		52.790	3	0.000		
50-59 years	0.338	3.431	1	0.064	1.402	0.981-2.004
60-69 years	0.804	19.612	1	0.000	2.235	1.565-3.190
≥70 years	1.207	39.168	1	0.000	3.344	2.291-4.881
Educational level						
≤11 years	0.171	1.999	1	0.157	1.187	0.936-1.505
Family history of hypertension						
Yes	0.280	6.048	1	0.014	1.323	1.059-1.654
Body mass index						
<25 kg/m^2		12.801	2	0.002		
25-29.99 kg/m^2	0.389	10.466	1	0.001	1.475	1.166-1.867
≥30 kg/m^2	0.470	7.338	1	0.007	1.600	1.139-2.49
Nephropathy						
Yes	0.777	2.510	1	0.113	2.175	0.832-5.689

(Hosmer-Lemeshow test: p=0.227)
CI- confidence interval, df- degrees of freedom, OR- odds ratio

Table 3. Types of hypertension and the mean of ages in study groups

Types of hypertension	n	%	Age, years	
			Mean±SD	95% CI
Normotensive	347	17.2	59.18±10.01	58.12-60.24
Prehypertension	622	30.6	59.92±10.33	59.10-60.73
Stage I hypertension	590	29.0	62.94±9.97	62.14-63.75
Stage II hypertension	472	23.2	64.46±9.72	63.58-65.34
Total	2031	100.0	61.73±10.24	61.28-62.14

F=28.764, df=3, p<0.001
CI- confidence interval, df- degrees of freedom, SD- standard deviation

Controversially, SI (X^2=11.696; p=0.000), SII (X^2=41.431; p=0.000) and ISH (X^2=64.754; p=0.000) measures increase by age. Chockalingam et al (16) reported prehypertensive in 46.6%, SI in 20.0%, SII in 14.7% of studied population. Gupta et al. (12) reported SI in 24.9%, SII in 11.7%.

Awareness for hypertension was determined in 64.8% in hypertensive patients and increased by age (p<0.001). Some studies (8, 11, 13, 17, 19, 42, 43) reported ratio of awareness to vary between 26.0% and 60.2%. Kirkland et al. (43) reported that prevalence of awareness decreases by increasing age.

Previous studied studies (8, 10, 11, 17, 19, 32) reported that 26.7% to 42.0% of hypertensive patients had medication for hyper-

Table 4. Awareness, treatment and control of hypertension compared by age

Age groups	Awareness (n=1062)		Treatment (n=1062)		Control (n=517)	
	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)	Yes, n (%)	No, n (%)
40-49 years	34 (40.5)	50 (59.5)	23 (27.4)	61 (72.6)	3 (13.0)	20 (87.0)
50-59 years	180 (65.2)	96 (34.8)	138 (50.0)	138 (50.0)	13 (9.4)	125 (90.6)
60-69 years	245 (67.1)	120 (32.9)	189 (51.8)	176 (48.2)	14 (7.4)	175 (92.6)
≥70 years	229 (68.0)	108 (32.0)	167 (49.6)	170 (50.4)	7 (4.2)	160 (95.8)
Total	688 (64.8)	374 (35.2)	517 (48.7)	545 (51.3)	37 (7.2)	480 (92.8)
Chi square test	X2=24.136; p<0.001		X2=16.954; p<0.001		X2=4.491; p>0.05	

* - Awareness- As any prior diagnosis of hypertension by a health care professional
Treatment- As a self-reported use of pharmacological medication for the management of high blood pressure within the 2 weeks preceding the participant's interview
Control- As having an average systolic blood pressure less than 140 mmHg and an average diastolic blood pressure less than 90 mmHg in the context of pharmacological treatment of hypertension

tension. In our study, we found that 48.7% of hypertensive patients had medication for hypertension. Good controlled hypertensive ratio was 7.2% in treated hypertensive patients and we could not find any association between hypertension and age (p>0.05). the good controlled rates varied between 6.0% and 42.0% as reported by previous studies (8, 10, 11, 19, 42).

In conclusion, this study determined high mean blood pressures in over 40 years aged men in Eskişehir city center. Absence of awareness for hypertension was determined in 35.2% in hypertensive patients, 48.7% of hypertensive patients had medication for hypertension and good controlled hypertensive ratio was 7.2% in treated hypertensive patients.

We determined the most important risk factors as family history of hypertension, older age, obesity for hypertension.

These results suggest that further educational programs among risk factors of hypertension, screening studies for early diagnosis and treatment of blood pressure in periodic times, and measure of BP in the course of physical examination of especially over 40 years aged men populations in primary health care centers for prevention and control of hypertension is needed in Eskişehir city center.

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