



DISTRIBUTION, AWARENESS, TREATMENT, AND CONTROL OF ARTERIAL HYPERTENSION IN YEREVAN (ARMENIA)

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Abstract

Objective: Present study was aimed at investigated aspects of distribution, awareness, treatment, and control of arterial hypertension in population of Yerevan.

Methods and results: To estimate distribution of blood pressure (as per ESH/ESC 2003 classification and staging criteria) and examine hypertensive patients' knowledge on their condition, the authors randomly surveyed 748 individuals aged from 18 to 90 in Yerevan, Armenia. Questionnaires were supplemented with blood pressure measurements (in accordance with ESH recommendations). A total of 205 (27.4%) study participants were classified as hypertensive ($\geq 140/90$ mm Hg and/or undergoing any antihypertensive therapy); 37 (4.9%) had isolated systolic hypertension. Among hypertensive, only 125 (61.0%) labeled their blood pressure as "high"; of those, 80 (64.0%) received any antihypertensive pills at the moment of survey (39.0% of all hypertensives), and of those being treated, only 18 (22.5%) were controlled (8.8% of all hypertensives). Males aged from 18 to 41 (low awareness and low treated), males aged 41 and over (low control), and females (low treated) could be viewed as three subgroups of people at the most risk.

Conclusions: The prevalence of hypertension is high but the awareness is low in Yerevan community, and intervention is necessary to impose control measures and to improve awareness.

Keywords: hypertension, prevalence, knowledge, awareness, control, Yerevan.

INTRODUCTION

Cardiovascular disease (CVD) is the leading cause of mortality worldwide; in 1990 it was estimated to account for 14.3 million deaths [Murray C., Lopez A. 1996; 1997]. Arterial hypertension (HT) is one of the most modifiable causes of CVD morbidity and mortality all over the world [Wolf-Maier K. et al., 2004]. In the developed societies, the detection, treatment, and control of HT are characterized by the "rule of halves" [Smith W. et al., 1990]. During the past decade, large-scale surveys were conducted in different countries to estimate the prevalence of arterial hypertension and other CVD risk factors (RF) [Banegas J. et al., 1998; Priimatesta P. et al., 2001].

In Armenia, there is still no relevant data on

prevalence, awareness, treatment, and control of HT, as well as on such an important cardiovascular risk indicator as isolated systolic hypertension (ISH). Based on data from a representative sample of Yerevan population, this article presents distribution of blood pressure (BP) levels as they are categorized in ESH/ESC 2003 guidelines [Guidelines for ESH/ESC, 2003], degree of awareness, treatment, and control of HT; values of ISH. This data gives the main epidemiological indicators of HT for Yerevan city, the capital and major urban centre of Armenia, one of the South Caucasus countries, with 817,200 inhabitants above 18 that constitutes about one third of country population over 18.

MATERIAL AND METHODS

Data were drawn from the "Prevalence of Arterial Hypertension and its Risk Factors among Adult Population of Yerevan" cross-sectional study conducted in Yerevan in April-May 2004. It stands for

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the only relevant study currently available that contains complete epidemiological data on high BP in Yerevan population.

The study was conducted by a household survey that was carried out in all 12 communities of Yerevan City, Armenia. Study participants were selected through address-based randomization. A team of general practitioners of Armenian Medical Association (ArMA), who were trained to measure blood pressure and to collect data, visited the selected households.

The detailed structured questionnaire contained age, sex, educational standards, occupation, dietary habits, smoking, and drinking patterns, amount of salt intake, details of associated illnesses, awareness of hypertension, and details of hypertension treatment, when applicable. To conduct the survey, in each household the team of general practitioners arranged brief discussions on the importance of regular blood pressure check-ups, risk factors for development of high blood pressure and complications related to HT.

Blood pressure was measured in the sitting position with a back support, after a resting period of 5 minutes, using UA-200 aneroid sphygmomanometers ("A&D" Co. Ltd., Japan) with proper-sized cuffs. Smoking and caffeine intake were excluded 30 min before and during measurement. Blood pressure readings were obtained using standardized methods in accordance with ESH recommendations [O'Brien E. et al., 2003]. The first and fifth Korotkov's sounds were used to determine systolic blood pressure (SBP) and diastolic blood pressure (DBP). Two other BP measurements were done with at least 2 min intervals on each participant within 30 min, and the mean value of the recorded BP was considered as the BP of the participant.

For analysis of data obtained, blood pressure was graded according to the ESH/ESC 2003 criteria [Guidelines for ESH/ESC, 2003]. All those with SBP ≥ 140 mm Hg and/or DBP ≥ 90 mm Hg (taking into account the average of 3 measurements in the arm with higher BP readings) and/or those taking antihypertensive medication were classified as "hypertensive". The subjects were considered aware of their disease, if they knew the need for

measuring BP regularly and the need for lifestyle modification or treatment in case of high blood pressure and/or HT. For instance, we put questions: "Do you regularly check your blood pressure?", "Do you consider BP $\geq 140/90$ mm Hg as a pathological condition, which requires treatment?", etc. Treatment of hypertension was defined as a self-reported use of any antihypertensive pharmacological medication for the management of high BP within 2 weeks preceding the interview. Finally, the control was defined as a state with an average SBP < 140 mm Hg and an average DBP < 90 mm Hg as a result of pharmacological treatment of hypertension at the time of household visit.

The proportion of HT population aware of their diagnosis, those receiving treatment, and subjects with controlled BP was determined by age group and gender. The 95% confidence intervals (CI) of HT prevalence, awareness, treatment, and control associated with participant characteristics were determined after adjustment for age and gender. All analyses were conducted using SPSS v14.0 computer software.

RESULTS

A total of 748 individuals were interviewed and screened. Among the respondents, 250 were males and 498 were females. Their mean age was 41 ± 18 years (range: 18–90).

Overall prevalence of HT was 27.4% ($n = 205$) (95% CI: 24.3-30.7%) with almost similar sex distribution: males: 28.8% (95% CI: 23.5-34.7) and females 26.7% (95% CI: 23.0-30.8) (Table 1). Age had a significant association with hypertensive state in both gender ($p < 0.001$).

HT prevalence was significantly higher in males than females aged 18-29 ($p < 0.05$). The prevalence of ISH was 6.4% (95% CI: 4.0-10.1%) without any significant age- or gender-related differences. ISH prevalence showed an approximately 18-fold increase from below 60-year age group (1.9% in males and 1.0% in females) to over 60-year age group (27.3% and 20.0%, respectively).

Figure 1 shows age-specific mean systolic and diastolic BP in both genders with 95% CI of standard deviation (SD). Systolic BP increased with

Table 1.

HT prevalence in Yerevan, by gender and age groups

Population group	Participants	BP \geq 140/90 mm Hg or Drug Therapy		SBP \geq 140 and DBP $<$ 90 mm Hg	
	n	n (%)	95% CI	n (%)	95% CI
Total	748	205 (27.4)	24.3-30.7	37 (4.9)	3.6-6.7
Males (total)	250	72 (28.8)	23.5-34.7	16 (6.4)	4.0-10.1
Males by age, y					
18-29	99	10 (10.1)*	5.6-17.6	1 (1.0)	0.2-5.5
30-39	26	3 (11.5)	4.0-29.0	-	-
40-49	42	12 (28.6)	17.2-43.6	1 (2.4)	0.4-12.3
50-59	39	17 (43.6)	29.3-59.0	2 (5.1)	1.4-16.9
60-69	27	18 (66.7)	47.8-81.4	4 (14.8)	5.9-32.5
\geq 70	17	12 (70.6)	46.9-86.7	8 (47.1)	26.2-69.0
Females (total)	498	133 (26.7)	23.0-30.8	21 (4.2)	2.8-6.4
Females by age, y					
18-29	157	5 (3.2)	1.4-7.2	-	-
30-39	71	5 (7.0)	3.0-15.4	-	-
40-49	111	27 (24.3)	17.3-33.1	-	-
50-59	74	36 (48.6)	37.6-59.5	4 (5.4)	2.1-13.1
60-69	49	33 (67.3)	53.4-78.8	7 (14.3)	7.1-26.7
\geq 70	36	27 (75.0)	58.9-86.2	10 (27.8)	15.8-44.0

Note: * $p < 0.05$ males vs. females

age (Figure 1), while diastolic BP peaked at the 60- to 69-year group followed with a plateau (Figure 2).

This pattern was recorded in males and females (Table 2). In both gender groups mean SBP and DBP increased with age ($p < 0.001$). Mean systolic and diastolic BP values were higher in males up to 40-49 (no significant difference). Vice versa, in females over 60 mean SBP and DBP was higher than in males (no significant difference).

A percentage breakdown showed that among hypertensives (205 participants), only 61.0% (95% CI: 54.2-67.4%) were aware of their condition; among them 64.0% (95% CI: 55.3-71.9%) were undergoing antihypertensive drug therapy: 39.0% (95% CI: 32.6-45.8%) of all hypertensives; among those being treated only 22.5% (95% CI: 14.7-32.8%) were controlled: 8.8% (95% CI: 5.6-13.5%) of all hypertensives (Table 3).

Awareness on HT and treatment rates were sig-

nificantly higher in females ($p < 0.05$). For males, 18-41 age group was less aware and treated subgroup ($p < 0.05$) than those of over 41. Control rates were higher in males of 18-41 than those over 41. Females aged over 41 showed the highest rate of

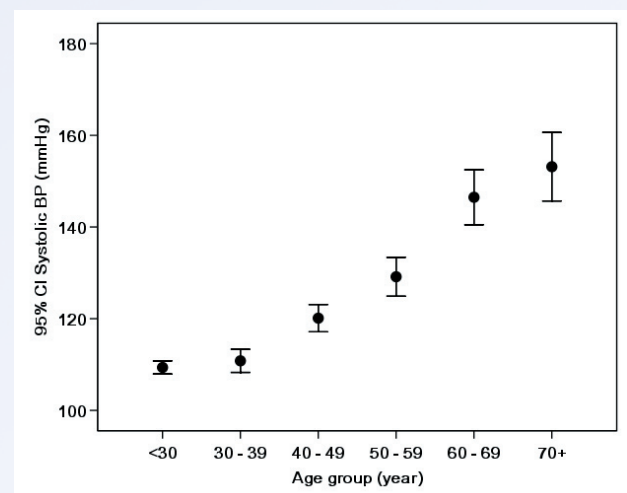


Figure 1. Systolic blood pressure by age group.

Table 2.

Indexes of mean blood pressure and standard deviations (SD) by age group and gender

Age Group (y)	Males			Females		
	n	SBP (mm Hg)	DBP (mm Hg)	n	SBP (mm Hg)	DBP (mm Hg)
18-29	99	114.5 (11.3)	73.9 (9.2)	157	106.1 (10.7)	69.3 (9.8)
30-39	26	115.9 (11.4)	76.0 (9.6)	71	108.9 (12.5)	71.7 (9.5)
40-49	42	120.6 (13.8)	80.0 (9.7)	111	119.9 (20.3)	78.7 (12.5)
50-59	39	127.8 (19.8)	83.0 (14.2)	74	129.8 (24.2)	82.7 (14.0)
60-69	27	142.3 (23.3)	87.8 (13.3)	49	148.8 (27.7)	89.4 (15.9)
70+	17	149.0 (24.9)	81.8 (10.7)	36	155.1 (28.2)	86.9 (15.7)
p		<0.001	<0.001		<0.001	<0.001

Notes: Results are mean (SD)

those seeking medical help. HT control was 27.8% (95% CI: 12.5-50.9%) for males and 21.0% (95% CI: 12.7-32.6%) for females with no significant gender difference.

Figure 3 shows the age-, and gender-specific prevalence of uncontrolled hypertension among all 205 hypertensives.

The percentage of subjects with treated and controlled HT was 8.8% vs. 30.2% of those with treated yet not controlled HT. Twenty two (10.7%) subjects from treated (63.5±12.5 years; 72.7% females) were not aware of their hypertensive status.

This study results could suggest that among 817,200 adult individuals in Yerevan, about 200,000-250,000 are hypertensive, whereas only 120,000-150,000 are aware of their condition; and only 75,000-85,000 seek for antihypertensive treatment, yet only 12,000-14,000 are somehow controlled. ISH affects about 30,000-55,000 or one of every 20 adults. Of every 10 who are aware, only 6 receive any antihypertensive drug treatment and of every 20 patients receiving treatment only 3 are controlled. Finally, of 20 hypertensive individuals, only 1 is controlled.

DISCUSSION

Applying identical HT criteria and age group (35-64 years), the situation in Yerevan could be ranked between the US, Canada and developed

European countries, being closer to the latter in terms of age-adjusted HT prevalence [Wolf-Maier K. et al., 2004]. The prevalence of HT in 35-64 years age group was 29.7% (95% CI: 25.2-34.7%) (105 out of 353 individuals) and only 3.7% (95% CI: 2.2-6.2%) was controlled (13 out of 353 individuals).

As for comparison with developed countries, HT prevalence among 35-64 years age group population of Yerevan makes 29.7%, awareness 22.9%, treatment 13.3% and control 3.7% of all hypertensives (27.7% HT control in treated subjects). On the average, the controlled HT in treated group is similar to that of European countries.

Overall, among persons at 35 to 64 years the

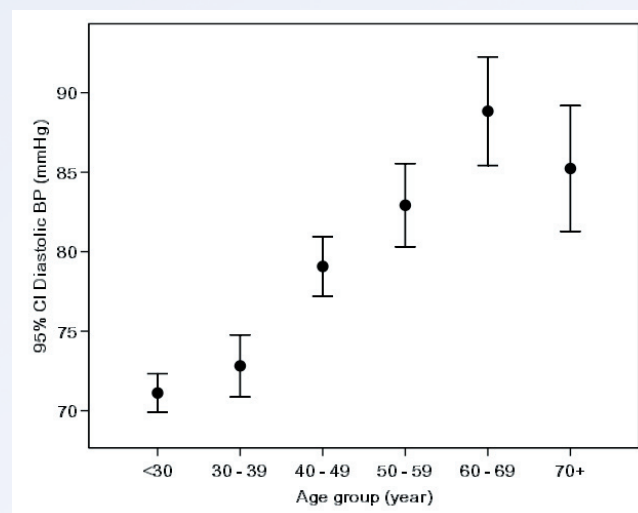


Figure 2. Diastolic blood pressure by age group.

Table 3.

Awareness, treatment, and control of HT in Yerevan

Population group	Hypertensives in groups	Aware among hypertensives		Treated among awares		Controlled among treated	
		n	n (%)	n	(%)	n	(%)
Total	205	125	61.0	80	64.0	18	22.5
Males (total)	72	37	51.4*	18	48.6*	5	27.8
Males by age, y							
18-41	25	8	32.0 [†]	3	37.5	3	100.0 [†]
≥41	47	29	61.7 [†]	15	51.7	2	13.3 [†]
Females (total)	133	88	66.2*	62	70.5*	13	21.0
Females by age, y							
18-41	37	24	64.9	13	54.2 [†]	5	38.5
≥41	96	64	66.7	49	76.6 [†]	8	16.3

Notes: * p<0.05, males vs. females; [†] p<0.05, 18-41 y vs. ≥41 y.

proportion of hypertensives aware, treated, and controlled was low. Only 13.3% participants with HT were receiving pharmacological treatment. This is substantially lower than the corresponding percentage (44.5%) for the US and Canadian population of similar age between 1988 and 1994, and half for the five European countries (27.2%).

Among the 35 to 64 years population group of Yerevan, 3.7% of hypertensives had their BP controlled at 140/90 mm Hg, compared with ≤10% in European countries, 17.2% in Canada, and 28.6% in the USA [Wolf-Maier K. et al., 2003].

CONCLUSION

Our study has found a high prevalence of hypertension in Yerevan (27.4%). Blood pressure control among subjects with HT is rather low (8.8%). Controlled HT among treated subjects sums up to 22.5%. Among population aged from 35 to 64, only 3.7% periodically control their BP that is markedly lower than the same rate in the US (28.6%) and Canada (17.2%).

However, taking into account low awareness and treatment rates, the control over the HT is similar to that of the European region (27.7% vs. 27.6%) that could be explained by the relatively high effectiveness of antihypertensive treatment in Yerevan.

HT awareness, treatment, and control levels, particularly, the latter, are still remaining at the unacceptable low rates, and the most exposed subjects are males aged 18 to 41 (low awareness) and females over 41 (low control), which suggests that those groups are to be targeted for patient education projects to reduce cardiovascular risks and consequences in Yerevan. In addition, control over HT would be significantly improved through awareness raising on arterial hypertension.

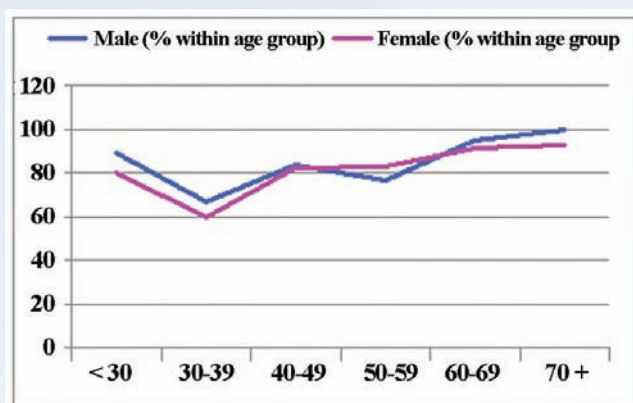


Figure 3. Age-specific prevalence of uncontrolled hypertension.

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