Iranian Journal of Diabetes and Lipid Disorders; 2010; Vol 9, pp 1- 7

Prevalence of Hypertension and Diabetes in Elderly: Elderly Kahrizak Study (Brief Communication)

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Abstract

Background: The study aimed to investigate the prevalence of hypertension and type2 diabetes in Iranian elderly residents of Kahrizak Charity Foundation.
Methods: We recruited 266 volunteers among a total of 985 elderly residents of Kahrizak Charity Foundation who were ≥60 years based on stratified ward randomized sampling during 2006-2007.
Results: Crude prevalence of hypertension was 55% in men and 67% in women. Diabetes prevalence was 21% in men and 16% in women.
Conclusion: diabetes and hypertension are worryingly prevalent in elderly and necessitates further studies and influential health policy decisions.

Keywords: Hypertension, Type2 diabetes, Elderly

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Introduction

Hypertension and diabetes in elderly and adulthood are two major risk factors of cardiovascular diseases (1, 2). Cardiovascular complications are two- to three- folds higher in hypertensive than normotensive elderly, even after adjustment for age and sex (3). An 11-year follow-up study has shown that in diabetic subjects aged>65, cardiovascular disease is accounted for nearly 50-60% of mortality (4).

Studies on the prevalence of these risk factors in this age group are limited (5, 6). The aim of the present study is to investigate the prevalence of hypertension and type2 diabetes in elderly residents of Kahrizak Charity Foundation, Tehran, Iran.

Methods

We recruited 266 volunteers among a total of 985 elderly residents of Kahrizak Charity Foundation who were ≥60 years based on stratified ward randomized sampling during 2006-2007. Demographic and medical characteristics were taken including age, gender, history of hypertension, diabetes and its type and duration. Participants gave informed consent. Fasting glucose, cholesterol, triglyceride, LDL-cholesterol, and apo-B lipoproteins levels were measured. Weight and height, also waist and hip ratio were measured. Mean of two separated blood pressure measurement with one month interval was reported.

Hypertension determined based on JNC VII criteria (7) and type2 diabetes diagnosed according to American Diabetes Association as average of two measurement of fasting blood glucose ≥ 126 mg/dl and/or taking hypoglycemic agents (8). Body mass index [as weight / height (kg/m^2)] of 27-29 kg/m^2 in males and 25-27 kg/m^2 females assumed optimal (9).

Results

A total of 266 elderly aged ≥ 60 participated in this study. Mean body mass index (BMI) was significantly higher in females than males (P<0.001). According to the BAPEN categorization, there was significant difference between males and females (P<0.001) (Table 1). The overall prevalence of hypertension in both sexes was 61% (males 55%, females 67%). The overall prevalence of hypertension was significantly higher in women than men in all age groups. In age group below 70 years of age mean systolic and diastolic blood pressures were higher in men than women; nevertheless, mean diastolic blood pressure was higher in women. In age group over 80 years of age, the mean systolic and diastolic blood pressures were higher in men than women (Table 2). Contributing factors of hypertension in hypertensive and normotensive subjects are presented in Table 3. Mean age in hypertensives were significantly higher than normotensives (P<0.04). The prevalence of diabetes mellitus was 21% in men and 16% in women. Prevalence of diabetes mellitus in older age groups was higher than other age groups (Table 4). Mean fasting blood glucose levels were lower in men than women in elderly who aged<70, were lower in women than men aged 70-80, and over 80 years of age were similar in both sexes (Table 2). Mean age (P<0.002), body mass index (P<0.001), waist/hip ratio (P<0.001), Cholesterol (P<0.004) and LDL-cholesterol (P<0.01) were higher in diabetics than normal subjects (Table 4).

Table 1. Comparison of general and clinical characteristics of elderly participants of Kahrizak Study

	Men Mean±SD	Women Mean±SD
Age (year) †	71± 10	77± 8
Age Categorization		
< 70	47	29
70-80	37	45
> 80	35	73
Body mass index (Kg/m^2) †	24± 4.7	26.1± 5.6
Body mass index (BAPEN categorization) †		
Underweight	91	59
Normal	10	24
Overweight	15	57
Body mass index (Normal categorization) *		
Underweight	10	10
Normal	64	51
Overweight	45	86
Fasting blood sugar (mg/dl) *	100.4± 31	97.7±38.2
Systolic blood pressure (mmHg)	134.3± 23.3	132.5± 24.5
Diastolic blood pressure (mmHg)	77.5± 13.3	76.6± 14.9
Marriage Status †		
Married	14	8
Single	49	13
Separated	26	22
Widowed	30	104

*: P < 0.05
†: P < 0.001

Table 2- Comparison of mean blood pressure and fasting blood sugar in different age groups of elderly residents of Kahrizak

Age group	Men				Women				Total			
	No	SBP	DBP	FBS	No	SBP	DBP	FBS	No	SBP	DBP	FBS
< 70	36	133.59 ± 20.07	79.26 ± 13.86	105.11 ± 32.68	24	132.73 ± 24.77	7.46 ± 15.51	109.29 ± 61.73	60	133.23 ± 21.94	78.56 ± 14.43	106.75 ± 45.70
70-80	30	.33.19 ± 24.75	77.58 ± 13.74	99.11 ± 31.81	36	133.77 ± 26.92	80.26 ± 16.93	93.70 ± 29.01	66	133.53 ± 25.83	79.05 ± 15.52	96.16 ± 30.22
> 80	30	136.52 ± 26.50	75.20 ± 12.07	95.34 ± 27.48	50	131.26 ± 22.77	73.73 ± 12.61	95.57 ± 30.44	80	133.25 ± 24.18	74.25 ± 12.37	95.51 ± 29.46
Total	96	134.34 ± 23.38	75.58 ± 13.31	100.47 ± 31.02	110	132.51 ± 24.56	76.68 ± 14.93	97.72 ± 38.27	216	132.78 ± 24.00	77.07 ± 14.06	98.91 ± 35.27

Table 3- Comparison of basic characteristic in elderly hypertensive residents of Kahrizak

Variables \ Hypertension status	Normal n= 74	Hypertensive n= 119
Sex (M/F)	0.76	1.2
Age (years) *	72.4± 10	75.3± 9.2
Body mass index (kg/m^2)	24.9± 5	25.6± 5.6
Smoking (%)		
Never	80.8	72.9
Smoking cessation (< 10 year)	5.5	8.5
Smoking cessation (> 10 year)	1.4	3.4
Current smoker	12.3	15.3
Education (%)		
Illiterate	70.3	68.1
Primary school	16.2	16.8
Guidance & high school	10.8	10.1
Sixth grade & higher	1.4	1.7
BSc and higher	1.3	3.3
Alcohol Consumption (%)		
Never	91.9	88.2
Cessation	8.1	8.4
Sometimes	0	3.4

*P < 0.05

Table 4- Comparison of basic characteristics in elderly diabetic residents of Kahrizak study

Variables \ Diabetes status	Normal n= 201	Diabetics n=45
Sex (M/F)	0.76	1.2
Age (years) *	72.4± 10	75.3± 9.2
Body mass index (kg/m^2) *	24.9± 5	25.6± 5.6
Waist/hip ratio †	0.9 ± 0.07	0.96 ± 0.06
Total Cholesterol (mg/ dl) †	187.7±43.6	213.1± 63.6
HDL Cholesterol (mg/ dl)	44.7± 12.8	41± 11.5
LDL Cholesterol (mg/ dl)	112.5±28.8	127.2±45.5
Systolic blood pressure (mmHg)	132.5±24.9	135.5±22.3
Diastolic blood pressure (mmHg)	76.4± 14.3	78.7±13.4
Hypertensive status (%)	59.4	69.4
Smoking (%)		
Never	77.9	73.3
Smoking cessation (< 10 year)	5.5	6.7
Smoking cessation (> 10 year)	2.5	2.2
Current smoker	14.1	17.8

* : P< 0.05
† : P < 0.01

Discussion

The overall prevalence of hypertension in elderly aged≥60 years in present study are in accordance with the previously performed studies in Egypt (10), Taiwan (11), Italy (12) and Spain (13, 14); nonetheless, our results on prevalence was higher than that in China (15), NHANES III (16), Singapore (17), Bangkok (18) and lower than that in Turkey (19). These variations may attribute to different methods of blood pressure examinations, using varied cut-point for defining systolic and diastolic hypertension, and the method of reporting antihypertensive drugs. In addition, other potentially confounding factors such as food habits, body mass index and genetic factors could explain these differences (20).

Higher prevalence of hypertension in women than men in all age groups which is in accordance with those of NHANES III (17), Ozkara *et al.* (19), Prencipe *et al.* (12) and Feng-Hwa *et al.* (11). Decreasing trend of blood pressure in men and irregular trend of decreasing diastolic blood pressure in women is in agreement with Feng-Hwa findings (11).

Prevalence of diabetes mellitus in elderly are in accordance with those of Rotterdam study (21), Finland (22) and NHANES III (23) and is higher than those of Hoorn Study (24), Zuphten Study (25) and one population-based study in Italy (26), which could be due to the different patterns of life-style and preventive policies in industrialized and developing countries. These differences may be due to different age pattern of diabetes prevalence in developed and developing countries (27), nutrition transition in Iran (28). Dietary ingredients rich-in saturated fatty acids, insufficient consumption of complex carbohydrates and lower levels of physical activity have higher incidence in elderly diabetics (29).

Due to the same pattern of diabetes mellitus in both sexes aged <65 (27), higher prevalence of diabetes mellitus in women could be attributed to the different patterns of mortality rate between both sexes and higher prevalence of diabetes in elder ones (27). The results of present study on diabetes prevalence are in concordance with findings of Tehran Lipid & Glucose study (30).

Higher systolic and diastolic blood pressures, body mass indices, waist to hip ratios, cholesterol levels and hypertension prevalence in our diabetic subjects are in accordance with findings of Rotterdam Study (21) and Larijani study (31). Several studies have shown that body mass index in diabetic subjects is higher than healthy ones (31-34). Also, a number of studies have shown the relation between hypertension and diabetes (34, 35).

Findings of the present study have shown that prevalence of diabetes mellitus and hypertension in elderly residents of Kahrizak is relatively high. It is recommended that the relation between dietary and health policy decisions in the previous decade and the current outbreak of chronic diseases be investigated in a further secondary analysis study.

Acknowledgement

This work was financially supported by Endocrinology and Metabolism Research Center (EMRC) affiliated to Tehran University of Medical Sciences (TUMS). We should thanks all study participants. We also should thank Ms. Neda Nazari who supervised this study in Kahrizak charity foundation. There was no conflict of interest.

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