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Relationship Between Hypertension and Consumption Frequency of Certain Foods

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Abstract: This study is planned and conducted on the individuals aged 65 years old and over with hypertension in order to make a connection between consumption frequency of certain food that might be related to hypertension. The sample consists of 110 patients who had applied to GOLBASI HASVAK State Hospital for any reason and who had accepted to participate in the study. The data were collected by a food frequency questionnaire and the explanatory variables are gender, age and Body Mass Index. The body weights of 11.9% of the participants are found within the normal boundaries. Hypertension is a major health problem which has a percentage of 76.1. The differences among the average blood pressure values is statistically important according to food consumption frequency, which is the condition of consumption of yogurt ($p < 0.001$) for systolic and that of egg and meat for diastolic. It is important especially to deal with the hypertension problems in the elderly and keep it under control that every country should foster health policies according to their society and make it possible to carry out such policies. In addition, a certain behavior should be developed starting from the childhood which may affect the quality of life positively.

Key words: Elderly, hypertension, food consumption frequency, blood pressure

INTRODUCTION

The percentage of elderly individuals in general population of developed and developing countries steadily increases over the years (Bales and Ritchie, 2006; Ulger and Cankurtaran, 2008). Hypertension is a major risk factor for coronary, cerebral and renal vascular diseases if it is not controlled (Vos *et al.*, 2003; Zungur and Yildiz, 2004). Casiglia *et al.* (2002) detected hypertension as a risk factor for cardiovascular mortality especially in elderly people. The frequency of hypertension significantly increases with advancing age. With ageing, demolishment of elastic fibers within large veins, increasing atherosclerosis result in increases in systolic blood and pulse pressures and cause isolated systolic hypertension characterized with decreasing diastolic blood pressure (DBP) (Yorgun and Kabakci, 2010). Systolic blood pressure (SBP) increases with age in industrialized countries and long living individuals are known to face with systolic hypertension development risk. On the other hand, in the societies of developing countries with limited energy and salt consumption, blood pressure remains low and does not increase with age (Ulger and Cankurtaran, 2008). Adequate and balanced diet in the old age, preserving appropriate body weight, consuming fat-reduced milk and milk products, reducing salt and beverages like tea and coffee and non-smoking are important factors that increase life quality of old people (Anonymous, 2002; Aksoydan, 2008).

MATERIALS AND METHODS

Design: The study was designed to show relation between the consumption frequency of certain foods and blood pressure on elderly people.

Participants: The study was conducted with 110 participants age 65 or older who had applied to HASVAK State Hospital in Golbasi County of Ankara Province due to any reason and willing to participate in the study. All the participants were informed about the study and they signed a consent form created based on Helsinki Declaration. The age distribution of old people is as follows; 41.8% in 65-69 years of age, 29.1% in 70-74 years of age, 18.2% in 75-79 years of age and 10.9% in 80 years and older group. The majority of participants (40.0%) were illiterate, 22.7% were primary school graduate, 1.8% secondary school graduate, 65.5% were married and 34.5% were widow/divorced. The majority of females (90.1%) were housewives and all male participants (100.0%) were retired.

Data collection: Data were collected using a questionnaire form in face-to-face interviews made by trained dietitians. Height was measured to the nearest 0.1 cm and weight to the nearest 0.5 kg in light clothing and without shoes. Body Mass Index (BMI) was calculated as body weight (kg)/height (m²). Participants were classified, according to their BMI, into 4 groups as underweight (BMI < 18.5 kg/m²), normal weight (BMI: 18.5-24.9 kg/m²), overweight (BMI: 25.0-29.9 kg/m²)

and obese (BMI \geq 30.0 kg/m²) (Gibson, 2005; WHO/FAO, 2003). Food consumption frequency of the elderly participants, focusing on certain food which might cause hypertension was determined using a Food Consumption Frequency form. Saltiness of the food was evaluated based on self statements of the participants. Measurements of blood pressure, systolic blood pressure and diastolic blood pressure, measured after 10 min rest in a sitting position with a blood pressure monitor. Blood pressures were measured twice for each participant and the mean value is used in the study. Systolic blood pressure and diastolic blood pressure measurements of elderly people were classified as <120/80 optimal, 120-129/80-84 normal, 130-139/85-89 limit and \geq 140/90 hypertension (Anonymous, 2004). In the analysis, normal and limit values (130-139/85-89 mmHg) were combined and evaluated as prehypertension. Hypertensive participants were evaluated based on whether they have a hypertensive drug prescription.

Statistical analysis: Analyses were performed with Statistical Package for the Social Sciences version 16.0 (SPSS, Inc., Chicago, IL, USA). When evaluating the demographic properties of the participants, numbers and percentages were taken. The mean and standard deviation of the parameters were calculated. In the

statistical analysis of data, chi-square (χ^2) significance test, One-Way ANOVA test for determining intergroup differences of hypertension values and LSD test for determining the source of difference among groups were used in the study. Statistical significances were established at a p-value of <0.05 and <0.001.

RESULTS

A total of 110 participants, of whom 61 were female (55.5%) and 49 were male (45.5%). The mean age was 71.63 \pm 5.68 years (females: 71.16 \pm 5.40 years, males: 72.22 \pm 6.01 years).

In Table 1, only a small percentage of participants (11.9%) are within normal limits in terms of BMI. The majority of old people (87.3%) stated to have health problems diagnosed by a physician. This rate was found higher in females (95.1%) than in males (77.6%) and accordingly, hypertension is the most frequent health problem (76.1%) in both genders. The rate of prescribed drug use for the diseases they have was 82.7%, following a diet program prescribed by a health care professional was 53.6%. Less than half of elderly (40.9%) one participates in physical activity. The difference between BMI, having health problem, prescription use to control hypertension, dieting and physical activity status was statistically significant in terms of gender (p<0.05).

Table 1: Certain individual characteristics

Characteristic	--- Female (n = 61) ---		---- Male (n = 49) ----		--- Total (n = 110) ---	
	n	%	n	%	n	%
BMI						
Normal	7	11.5	6	12.2	13	11.9
Overweight	13	21.3	24	49.0	37	33.6
Obese	41	67.2	19	38.8	60	54.5
----- $\chi^2 = 10.226$ sd = 2 p<0.05 -----						
Health problem						
Yes	58	95.1	38	77.6	96	87.3
No	3	4.9	11	22.4	14	12.7
----- $\chi^2 = 7.51$ sd = 1 p<0.05 -----						
Health problem (n = 96)						
Hypertension	48	82.8	25	65.8	73	76.1
Diabetes	30	51.7	17	44.7	47	48.9
Hypercholesterolemia/Heart disease	14	24.1	11	28.9	25	26.1
Asthma	8	13.8	7	18.4	15	15.6
Other (Osteoporosis/Rheumatism)	2	3.5	2	5.2	4	4.2
Prescribed drug use						
Yes	55	90.2	36	73.5	91	82.7
No	6	9.8	13	26.5	19	17.3
----- $\chi^2 = 5.30$ sd = 1 p<0.05 -----						
Diet for a disease						
Yes	44	72.1	15	30.6	59	53.6
No	17	27.9	34	69.4	51	46.4
----- $\chi^2 = 18.83$ sd = 1 p<0.05 -----						
Physical activity						
Yes	19	31.1	26	53.1	45	40.9
No	42	68.9	23	46.9	65	59.1
----- $\chi^2 = 12.12$ sd = 1 p<0.05 -----						

Table 2: SBP and DBP levels by gender, age and BMI

Variable	SBP (mmHg)						DBP (mmHg)					
	O (n = 12)		P (n = 42)		H (n = 56)		O (n = 53)		P (n = 25)		H (n = 32)	
	n	%	n	%	n	%	n	%	n	%	n	%
Gender												
Female	6	9.8	23	37.7	32	52.5	30	49.2	12	19.7	19	31.1
Male	6	12.3	19	38.8	24	48.9	23	47.0	13	26.5	13	26.5
Statistics	X ² = 0.21 p>0.05						X ² = 0.79 p>0.05					
Age (year)												
65-69	5	10.9	19	41.3	22	47.8	16	34.8	14	30.4	16	34.8
70-74	3	9.4	11	34.4	18	56.2	16	50.0	7	21.9	9	28.1
≥75	4	12.5	12	37.5	16	50.0	21	65.6	4	12.5	7	21.9
Statistics	X ² = 0.65 sd = 4 p>0.05						X ² = 7.53 p>0.05					
BMI (kg/m²)												
Normal	3	23.1	3	23.1	7	53.8	8	61.5	2	15.4	3	23.1
Overweight	3	8.1	22	59.5	12	32.4	16	43.3	11	29.7	10	27.0
Obese	6	10.0	17	28.4	37	61.6	29	48.3	12	20.0	19	31.7
Statistics	X ² = 12.631 p<0.05						X ² = 2.32 p>0.05					

O: Optimal, P: Prehypertension, H: Hypertension

Table 3: Systolic and diastolic blood pressure levels by certain variables

Variable	SBP (mmHg)						DBP (mmHg)					
	O (n = 12)		P (n = 42)		H (n = 56)		O (n = 53)		P (n = 25)		H (n = 32)	
	n	%	n	%	n	%	n	%	n	%	n	%
Non-smoking	5	9.4	18	34.0	30	56.6	28	52.8	9	17.0	16	30.2
Quitted smoking	5	11.1	18	40.0	22	48.9	21	46.7	11	24.4	13	28.9
Smoking	2	25.0	6	50.0	4	25.0	4	25.0	5	50.0	3	25.0
Statistics	X ² = 2.299 sd = 4 p>0.05						X ² = 3.622 sd = 4 p>0.05					
Alcohol												
Not using	9	9.4	37	38.5	50	52.1	45	46.9	21	21.9	30	31.2
Sometimes using	-	-	1	100.0	-	-	-	-	1	100.0	-	-
Quitted using	3	23.1	4	30.8	6	46.2	8	61.5	3	23.1	2	15.4
Statistics	X ² = 3.865 sd = 4 p>0.05						X ² = 4.940 sd = 4 p>0.05					
Tea darkness												
Normal	4	8.9	18	40.0	23	51.1	19	42.2	13	28.9	13	28.9
Light	8	17.0	21	44.7	18	38.3	26	55.3	9	19.2	12	25.5
Strong	-	-	3	16.7	15	83.3	8	44.4	3	16.7	7	38.9
Statistics	X ² = 11.669 sd = 4 p<0.05						X ² = 2.98 sd = 4 p>0.05					
Turkish coffee												
Drinking	3	6.6	21	46.7	21	46.7	25	55.6	8	17.8	12	26.7
Not drinking	9	13.8	21	32.3	35	53.8	28	43.1	17	26.2	20	30.8
Statistics	X ² = 2.962 sd = 2 p>0.05						X ² = 1.834 sd = 2 p>0.05					
Food saltiness												
Normal	5	13.2	17	44.7	16	42.1	20	52.6	10	26.3	8	21.1
Very salty	-	-	4	66.7	2	33.3	3	50.0	1	16.7	2	33.3
Low salty	4	8.5	12	25.5	31	66.0	23	48.9	10	21.3	14	29.8
Salt-free	3	15.8	9	47.4	7	36.8	7	36.8	4	21.1	8	42.8
due to illness												
Statistics	X ² = 9.358 sd = 6 p>0.05						X ² = 3.047 sd = 6 p>0.05					

O: Optimal, P: Prehypertension, H: Hypertension

The mean SBP and DBP were determined for the sample group as 141.25±21.81 mmHg and 79.36±14.91 mmHg, respectively. Systolic blood pressure of slightly more than half of the participants (50.9%) and diastolic blood pressure of a smaller part (29.1%) are within hypertension category. The rate of participants with optimal systolic blood pressure was 10.9%, while this rate was 48.2% for diastolic blood pressure.

In the investigation of SBP and DBP by gender and age, participants having SBP ≥140 mmHg were determined to have the highest percentage (Table 2). The rates of individuals with DBP <80 mmHg and ≥90 mmHg were equal in 65-69 years of age group (34.8%), while the rate

of those with <80 mmHg DBP was higher in all other groups. In terms of BMI, according to SBP, prehypertension were determined in overweight individuals (59.50%), normal and obese individuals had the highest rate of hypertension (53.8 and 61.6%, respectively).

In the investigation of SBP and DBP of elderly by certain parameters (Table 3), both systolic and diastolic prehypertension rates were found highest in those individuals smoking and sometimes using alcohol (50.0 and 100.0%, respectively). The mean daily tea consumption of participants was 4.72±3.02 tea glasses. Individuals drinking strong tea were determined to have systolic (83.3%) and diastolic hypertension and the

Table 4: Mean values and standard deviations of systolic and diastolic blood pressure by consumption status of certain foods

Food	Systolic Mean±S.D	Statistics	Diastolic Mean±S.D	Statistics
White cheese				
Never	140.55±15.95	F = 0.010	80.66±20.88	F=0.074
Generally	141.31±22.32	p = 0.921	79.24±14.39	p = 0.786
Sometimes	-		-	
Milk				
Never	144.55±21.32	F = 1.802	82.12±15.27	F=2.195
Generally	138.33±22.61	p = 0.170	76.47±13.42	p = 0.116
Sometimes	128.50±8.69		74.00±22.44	
Yogurt				
Never	164.83±22.49 ^a	F = 9.437	83.50±14.38	F = 1.348
Generally	138.72±20.31 ^b	p = 0.000**	79.25±14.58	p = 0.264
Sometimes	130.00±7.34 ^b		69.50±22.94	
Egg				
Never	147.09±23.98	F = 0.940	74.80±14.63 ^b	F = 4.567
Generally	139.97±19.46	p = 0.394	79.29±13.49 ^a	p = 0.012 ^c
Sometimes	138.71±38.27		93.85±23.45 ^a	
Red meat				
Never	141.10±23.08	F = 0.147	77.23±14.88 ^a	F = 3.312
Generally	140.05±21.00	p = 0.864	73.73±12.61	p = 0.04 ^a
Sometimes	144.45±13.08		87.27±15.65 ^a	
Chicken				
Never	149.76±25.00	F = 1.68	74.52±15.30	F = 1.286
Generally	140.28±21.19	p = 0.191	80.77±15.41	p = 0.921
Sometimes	137.42±20.41		78.21±11.96	
Fish				
Never	139.47±19.75	F = 1.995	80.23±16.40	F = 0.239
Generally	139.25±25.31	p = 0.141	78.07±13.68	p = 0.788
Sometimes	150.26±17.53		79.73±13.69	
Giblets				
Never	141.14±22.20	F = 0.389	79.38±15.17	F = 0.097
Generally	137.50±19.79	p = 0.679	77.50±12.66	p = 0.908
Sometimes	149.75±15.92		81.75±13.96	
Soujouk-salami etc				
Never	140.76±22.16	F = 0.167	79.70±14.97	F = 2.220
Generally	144.18±22.42	p = 0.847	73.75±11.45	p = 0.114
Sometimes	140.62±18.60		86.87±17.85	
Pickle				
Never	137.10±21.27	F = 2.915	78.32±15.70	F = 0.587
Generally	147.39±22.42	p = 0.059	80.29±13.18	p = 0.558
Sometimes	144.00±11.81		85.00±19.18	
Instant canned foods				
Never	141.27±21.14	F = 10.192	79.66±15.01	F = 0.634
Generally	144.66±48.68	p = 0.826	73.00±12.12	p = 0.533
Sometimes	129.00±0.00		67.00±0.00	
Olive				
Never	140.05±20.48	F = 0.829	83.47±18.14	F = 1.188
Generally	141.77±22.08	p = 0.439	78.76±14.23	p = 0.309
Sometimes	114.00±0.00		65.00±0.00	

*p<0.05 **p<0.001. The differences between the mean values indicated in the same column with the same letter are statistically insignificant. SD = Standard deviation

relationship between tea darkness and SBP was statistically significant (p<0.05). Less than half of participants drinking Turkish coffee (46.7%) had systolic hypertension, while a smaller part of them had diastolic hypertension. More than half of participants consuming salty food (66.7%) were determined to have systolic hypertension and 33.3% of them had diastolic hypertension.

In Table 4, the differences between the mean blood pressure levels are statistically significant in terms of

yogurt consumption in systolic (p<0.001) and egg and red meat consumption in diastolic (p<0.05). The source of the difference in yogurt consumption is the group never consuming yogurt, while the group sometime consuming egg is the source of difference in egg consumption. Considering the frequency of red meat consumption, a relation is detected between groups never or sometimes consuming red meat.

DISCUSSION

Current hypertension guides require that lifestyle changes should be recommended to all hypertension patients. Some guidelines include losing weight, diet poor in salt, physical activity, reduced amount of saturated fat in diet and diet rich in vegetables and fruits (Yorgun and Kabakci, 2010). Hypertension prevalence increases and the majority of hypertensive individuals live in developing countries (Yurdakul and Aytakin, 2010). The total population in developing countries 65 years and older has increased 6.9% since 2008 (Anonymous, 2009).

Obesity is an important risk factor for many chronic diseases related to hypertension, diabetes and coronary heart diseases (Tsai *et al.*, 2007). Only a small number of participants (females: 11.5%, males: 12.2%) were determined to have body weight within normal limits in terms of BMI. The rate of morbid obese women (14.8%) was higher than that of men (2.0%). Among the health problems diagnosed in the majority of old people (87.3%), the most common three diseases are hypertension (76.1%), diabetes (48.9%) and hypercholesterolemia/heart disease (26.1%). Similar to the results of the study, Ozdemir *et al.* (2005) determined that the majority of women (60.9%) had hypertension, while a smaller number of them (19.7%) had diabetes and 22.7% had coronary disease.

The mean SBP and DBP of study sample were determined as 141.25±21.81 mmHg (female: 142.72±21, male: 139.43±22.189 mmHg) and 79.36±14.91 mmHg (female: 79.75±14.69 mmHg, male: 78.87±15.31 mmHg). Similarly, another study reported that the mean blood pressure was higher in women than in men (Ozdemir *et al.*, 2005).

Women are more prone to hypertension than men in terms of SBP 52.5% and DBP 31.1% (Male SBP: 48.9% and DBP: 26.5%). In HinT study, most of hypertensive individuals (61.0%) consist of women (Arici *et al.*, 2010). In PatenT study, hypertension prevalence in geriatric population was found 75.1% (female 81.7%, male 67.2%) (Altun *et al.*, 2005).

Hypertension and especially systolic hypertension frequencies increase with age (Dagli and Ariogul, 2004). As a result of this study, systolic hypertension was 56.2% in 70-74 age group, 50.0% in ≥75 age group and 47.8% in 65-69 age group. In DBP, the highest rate of hypertension was determined in 65-69 age group

(34.8%). According to the 2009 data of TEKHARF study, the increase in blood pressure becomes significant starting from 40 years of age in men and 50 years of age in women (Onat, 2014).

In TEKHARF study, the mean blood pressure of Turkish women (133/82.3 mmHg) was higher than men (125.1/80 mmHg), which is related to higher BMI values of women (Onat, 2014). According to PatenT study, the mean BMI was significantly higher in women than men and in hypertensive individuals than normotensive ones (Altun *et al.*, 2005). As seen on Table 2, the correlation between SBP and BMI was statistically significant ($p < 0.05$).

Smoking is a risk factor for coronary artery disease. Quitting smoking is important in reducing mortality due to cardiovascular diseases (Ota *et al.*, 2002). Among older people smoking and using alcohol, ones with both systolic and diastolic prehypertension have the highest rate (50.0 and 100.0%, respectively). Smoking increases blood pressure and heart rate (Ikitimur *et al.*, 2010), while alcohol consumption more than three glasses a day increases blood pressure (Reddy and Katan, 2004). There is a positive relationship between blood homocysteine level and cardiovascular diseases. Excessive consumption of coffee and black tea increases homocysteine level in blood. For this reason, it is suggested that old people should not consume dark tea and more than 1-2 cups of coffee (Baysal, 2010). The blood pressure levels of individuals consuming dark tea are higher than those consuming light or normal tea. There is statistically significant relation between dark tea consumption and systolic blood pressure ($p < 0.05$). (Table 3).

It is known that dietary sodium affects on blood pressure (Anonymous, 2014). The suggested amounts in diet are 2.3 g sodium, 5.8 g sodium chloride or lower (Sacks *et al.*, 2001). 66.7% of individuals consuming salty foods were determined to have prehypertension and 33.3% of them had diastolic hypertension. On the other hand, 66.0% of individuals consuming low-salt food were determined to have high systolic blood pressure and 42.1% of individuals consuming salt-free food had high diastolic blood pressure. Although this contradicts with the linear relation between salt and hypertension, it was probably caused by the statements of participants. Epidemiological studies indicated that salt consumption in diet causes increases in blood pressure and contributes to hypertension prevalence (Dickinson *et al.*, 2006).

Salt increases blood pressure. The saltiest foods are milk, meat, egg and green leafy vegetables. And, the saltiest processed foods are brine foods (olive, cheese, pickle), canned foods, instant soups, coffee and bread (Baysal, 2010). In the investigation of mean values and standard deviations of systolic and diastolic blood pressures by certain foods consumed by elderly people

(Table 4), systolic blood pressure was found highest in individuals generally consuming white cheese, soujouk-salami etc., pickle, instant canned food and oil, while diastolic blood pressure was highest in those consuming egg, red meat, giblets, soujouk-salami etc. and pickle. The differences between blood pressure levels were statistically significant in systolic blood pressure ($p < 0.001$) in terms of yogurt consumption and in diastolic in terms of egg and red meat consumption ($p < 0.05$). The sources of difference are the group never consuming yogurt and the group sometimes consuming egg. There was also a difference between groups never and sometimes consuming red meat. In this study, it was expected that hypertension prevalence would be higher with respect to consumption frequency of some foods considered to be related with hypertension; however, this was not the case in most of the foods or the exact opposite case occurred. This result could be attributed to the fact that elderly stated their consumption frequencies by their perception and hypertension is more rather than with ageing than consumption of unhealthy foods affecting its prevalence.

Limitations: The most important limitation of this study is the absence of a dietary record that could be obtained by either a 24 h recall or by having participants keep a 3 day food record. This absence is due to the fact that older people in Turkey have difficulties remembering the food they have consumed mostly because they are not responsible of preparation of the food. Also, literacy rate among people older than 65 is relevantly scarce which made keeping a food record less possible. A more detailed information of the food and nutrient intake of the participants would give better results. Also, for elderly increasing energy intake by e.g. whole fat products might be strategy to maintain/increase body weight since by increasing age the nutrition problem of malnutrition becomes prevalent and is the main nutritional threat to health. Thus hypertension might be managed by prescribed drugs and maintaining BMI becomes more important.

Conclusion: The findings of this study suggest that SBP could increase with ageing. Increasing awareness on adequate and balanced nutrition from early ages and preparing public education programs to increase awareness are important to prevent chronic diseases that could develop in old ages or reduce their effects. Although there is no sufficient information about lifestyle changes in geriatric group aimed at hypertension, it is possible to reduce hypertension prevalence in society and especially in geriatric group by making positive behavioral changes within lifestyle changes like encouraging DASH diet, regular physical activity, keeping ideal body weight, not smoking and not using alcohol.

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REFERENCES

- Aksoydan, E., 2008. Yaslilik ve beslenme. T.C. Saglik Bakanligi Temel Saglik Hizmetleri Genel Mudurlugu Beslenme ve Fiziksel Aktiviteler Daire Baskanligi, Ankara, pp: 51-54.
- Altun, B., M. Arici, G. Nergizoglu, U. Derici and O. Karatan *et al.*, 2005. Prevalence, awareness, treatment and control of hypertension in Turkey (the Patent study) in 2003. *J. Hypertens.*, 23: 1817-1823.
- Anonymous, 2002. Yasli sagligi T.C. Saglik Bakanligi Temel Saglik Hizmetleri Genel Mudurlugu, Ankara, pp: 33-39.
- Anonymous, 2004. The Seventh report of the joint national committee on prevention, detection, evaluation and treatment of high blood pressure. National High Blood Pressure Education Program No: 04-52302004.
- Anonymous, 2009. TNSA Turkiye nufus ve saglik arastirmasi 2008. Hacettepe Universitesi Nufus Etutleri Enstitusu, Yayin No: NEE-HU.09.01, Hacettepe Universitesi Hastaneleri Basimevi, Ankara.
- Anonymous, 2014. WHO 2007 The effectiveness and costs of population interventions to reduce salt consumption. http://www.who.int/dietphysicalactivity/Neal_saltpaper_2006.pdf Accessed 01 March 2014.
- Arici, M., C. Turgan, B. Altun, S. Sindel and B. Erbay *et al.*, 2010. Turkish Society of hypertension and renal diseases. Hypertension incidence in Turkey (HinT); a population-based study. *J. Hypertens.*, 28: 240-244.
- Bales, C.W. and C.S. Ritchie, 2006. The Elderly. Eds, Maurice ES, Moshe SA, Catharina R, Benjamin Cirobot JC: Modern Nutrition in Health and Disease. USA:Lippincott Williams and Wilkins, pp: 843-858.
- Baysal, A., 2010. Yuz soruya yuz yanitla saglikli beslenme. Sistem ofset. Betik kitap yayin dagitim, Ankara.
- Casiglia, E., A. Mazza, V. Tikhonoff, R. Scarpa, F. Guglielmi and A. Pessina, 2002. Arterial hypertension and mortality in the elderly. *Am. J. Hypertens.*, 15: 958-966.
- Dagli, N. and S. Ariogul, 2004. Geriatrik populusyonda hipertansiyon tedavisi. *Hacettepe Tip Dergisi*, 35: 7-11.
- Dickinson, H.O., J.M. Mason, D.J. Nicolson, F. Campbell, F.R. Beyer and S.W. Cook *et al.*, 2006. Interventions to reduce raised blood pressure: a systematic review of randomised controlled trials. *J. Hypertens.*, 24: 215-233.
- Gibson, S.R., 2005. Principal of nutritional assessment. NY: Oxford University Press.
- Ikitemur, B., B. Karadag and Z. Ongen, 2010. Yaslilarda koroner arter hastaligi. *Turk. J. Geriatrics*, 2: 13-20.
- Onat, A., 2014. Toplumumuzda kan basinci ve hipertansiyon. *TEKHARF Calismasi 2009*, <http://tekharf.org/images/2009/bolum6.pdf>. Accessed 01 May 2014.
- Ota, A., Y. Mino, H. Mikouchi and N. Kawakami, 2002. Nicotine dependence and smoking cessation after hospital discharge among inpatients with coronary heart attacks. *Environ. Health Pre. Med.*, 7: 74-78.
- Ozdemir, L., G. Kocoglu, H. Sumer, N. Nur, H. Polat and A. Aker *et al.*, 2005. Sivas il merkezinde yasli nufusta bazi kronik hastaliklarin prevalansi ve risk faktorleri. *Cumhuriyet Universitesi Tip Fakultesi Dergisi*, 27: 89-94.
- Reddy, K.S. and M.B. Katan, 2004. Diet, nutrition and the prevention of hypertension and cardiovascular diseases. *Public Health Nutr.*, 7: 167-186.
- Sacks, F.M., L.P. Svetkey, W.M. Vollmer, L.J. Appel, G.A. Bray and D. Harsha *et al.*, 2001. Effects on blood pressure of reduced dietary sodium and the dietary approaches to stop hypertension (DASH) diet. DASH-Sodium collaborative research group. *N. Eng. J. Med.*, 344: 3-10.
- Tsai, A.C., J.C. Lioi, M.C. Chang and Y.L. Chuang, 2007. Influence of diet and physical activity on aging-associated body fatness and anthropometric changes in older Taiwanese. *Nutr. Res.*, 27: 245-251.
- Ulger, Z. and M. Cankurtaran, 2008. Yasli hastalarda hipertansiyona yaklasim. *Guncel Ic Hastaliklari Dergisi*, 1: 49-62.
- Vos, L.E., A. Oren, C. Uiterwaal, W.H.M. Gorissen, D.E. Grobbee and M.L. Bots, 2003. Adolescent blood pressure and blood pressure tracking into young adulthood are related to subclinical atherosclerosis. The atherosclerosis risk in young adults (ARYA) Study. *Am. J. Hypertens.*, 16: 549-555.
- WHO/FAO, 2003. Diet, nutrition and prevention of chronic diseases, WHO Technical Report Series, Geneva.
- Yorgun, H. and G. Kabakci, 2010. Yaslilarda hipertansiyon ve tedavisi. *Turk. J. Geriatrics*, 2: 5-11.
- Yurdakul, A. and S. Aytakin, 2010. Kadinlarda hipertansiyon. *Arch. Turk. Soc. Cardiol.*, 38: 25-31.
- Zungur, M. and A. Yildiz, 2004. Hipertansif hastaya yaklasim. *Surekli Tip Egitim Dergisi*, 13: 297-304.