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Pre-Hypertension and hypertension among primary-secondary school teachers in Çorum: results from a Turkish cross-sectional study

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Abstract

Hypertension is epidemic in worldwide nonetheless, approximately five million men and six million women are hypertensive in Turkish society. This study was aimed to determine hypertension prevalence and related factors in primary-secondary school teachers. This cross-sectional study was conducted among teachers working in pimary-secondary levels of public schools in Çorum province. The study was completed by 500 teachers. A 50-item questionnaire form was generated to question socio-demographic and occupational characteristics, health-illness status, behavioral health factors and measurements of blood pressure levels of and Body Mass Index. The prevalence of hypertension was 21.4% among teachers. Blood pressure was normal in the 53.4% and was pre-hypertension level in 38.6% of participants. In hypertensives, blood pressure levels were significantly higher. According to various features such as age groups, gender, occupations of partners, years of seniority and Body mass index, blood pressure levels showed significant differences. The risk of hypertension was 2 - fold higher between the age of 35-49 and 4.5 - fold higher between the age of 50-64 than the 25-34 age groups. The risk of hypertension was 3.5 fold higher in men than in women. One of every five teachers were found to be hypertensive. This result was important to remember that teachers were a specific group of physical health problems. Ensuring appropriate primary care systems and public health services for teachers should be a priority for lifestyle changes and early medical invention in school environment.

Key words: Hypertension, blood pressure determination, schoolteachers

Introduction

Hypertension is reaching epidemic proportions despite the modifiable risk factors [1]. Globally, nine million of all deaths are due to complications of hypertension such as heart diseases and stroke [2]. In 2008, the 40.0% of adults aged ≥ 25 diagnosed with hypertension in worldwide [2,3]. Nowadays, the prevalence of hypertension is increasing by aging and is estimated between the 30.0% - 45.0% [2]. Behavioral risks such as, increased population, aging, unhealthy diet, tobacco products, alcohol, insufficient physical activity, excessive weight gain and exposure to persistently stress are the contributor factors for hypertension. In developing countries, hypertension prevalence is two - fold higher than developed countries [2,3-5]. According to the Heart Disease and Risk Factors in Turkish Adults Study (TEKHARF), hypertension is an important public health issue, nonetheless, approximately five million men and six million women are hypertensive in Turkish society [6]. Teachers are defined one of the specific groups for venous diseases due to working conditions and stress [7,8]. But in studies examined teachers' physical health problems, prevalence of hypertension and effecting factors in teachers didn't considered largely [7,8].

In this study, we aimed to evaluate hypertension prevalence and related factors in primary - secondary school teachers.

Methods

Study setting

This cross-sectional study was carried out among the primary-secondary school teachers of public schools in the province of Çorum in 2013. Çorum-one of the oldest Anatolian cities and known for the valuable Hittite archaeology - is located inland in the central Black Sea Region of Turkey and has a population of 527 220. This study was planned in accordance with the Declaration of Helsinki and study protocol was approved by the Erciyes University ethics committee (date: 04 February 2013; No: 201 / 02 / 13).

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Study sampling
The study population was primary and secondary schoolteachers in public schools in Çorum. Offical records of Provincial Directorate of Education showed that there were 21 primary and 15 secondary schools with the total 580 teacher in the province. In primary schools the teachers work as class teachers, whereas in secondary schools teachers have speciality in teaching a spesific subject (mathematics, history of literature, social science and technology, English language, religious and cultural science, sports or arts). All schools in the area were invited to participate. Teachers from both genders were included the study. Reasons for non - participation were absence during the study period (5%), incomplete questionnaires (2.8%) and lack of interest in the study (6%). Study was completed with 500 teacher and response rate was 86.2%.

Study tools
A self-administered 50 - item questionnaire form was used to collect data. The questionnaire was structured into five sections (socio-demographic characteristics regarding age, gender, marital status, education; occupational characteristics regarding branches, organizations, years of seniority and partners' occupations; health- illness status regarding chronic conditions; behavioral health factors regarding general health perception, utilization of health services, smoking and alcohol; measurements regarding blood pressure level and Body Mass Index).

Data collection
Ten nursing students were trained for two days on tools and methods were involved in the data collection processes.

After the interview, teachers' blood pressure was measured providing that rested for at least five minutes and no smoking or caffeine 30 minutes before measurement. Blood pressure was measured three times in a sitting position using a standard mercury sphygmomanometer BP cuff with the appropriate cuff size that covered two-thirds of the upper arm. Consecutive measurements were taken five minutes after the first measurement. Finally, the average of the last two BP measurements was calculated to determine the BP status of the participant.

Then, teachers' heights and weights were measured with light clothes and no shoes, using a calibrated bascule and tape-line and recorded by the nursing students.

Definitions
Hypertension: A sustained high blood pressure level (Systolic Blood Pressure ≥140 or Diastolic Blood Pressure ≥90 mmHg) [9] or reported regular use of antihypertensive medication(s).

Pre-hypertension: Systolic Blood Pressure (SBP) is 120–139 mmHg or Diastolic Blood Pressure (DBP) 80–89 mmHg [9].

Normal: SBP is 90–119 mmHg and DBP 60–79 mmHg [9].

Body Mass Index (BMI): Diagnosis of BMI was based on the report of a WHO consultation and if BMI was 18.5 - 24.9 kg / m^2 it was considered as normal, if BMI was ≥ 25 kg / m^2 it was considered as overweight / obese [10].

Data entry and analysis
All analyses were performed using SPSS for Windows (version 17.0). In categorical data, **Pearson chi-square test** were used to compare groups. Also Binary Logistic Regression Analyses were used to predict high level blood pressure. Odds ratios (OR) and 95% confidence interval (CL) were calculated. $P < 0.05$ values was considered statistically significant.

Results

Background characteristics
Of 500 participants (mean age 42.91 ± 8.75 year) 66.4% of were male and the 33.6% of were female, 57.6% of were between the age of 35 - 49, 53.8% of were working in primary schools, 47.6% of were classroom teachers.

Heaalth-illness status of the study group were given in Table 1. There was one chronic disease at least in the 36.4% of participants, 15.6% of had received hypertension diagnosis previously. Of these, 35.9% of had a co - morbid conditions to hypertension, such as diabetes (32.1%), cardiovascular disease (28.5%) and Chronic Obstructive Pulmoner Disease (14.3%).

General health perception and utilization of health services in hypertensives and non-hypertensives were shown in Table 2. The 82.5% of non-hypertensives, described their general health perception as "good". This response was 61.5% in those with hypertension although was lower significantly ($P< 0.0001$). Frequency of going to a doctor without any health problems and appeal to family health centers primarily were higher in hypertensives, but it wasn't statistically significant.

Hypertension prevalence

Hypertension prevalence in teachers was given in Table 3. The 95.4% of the participants declared that they had measured their blood pressure previously. We detected new hypertensives in 6.9% of individuals. The prevalence of hypertension was 21.4% in the whole group. Mean SBP was 117.61±14.19 and mean DBP was 75.23 ± 10.28 in the participants.

Table 1. Health-illness status of teachers

	Whole group (n=500)		Hypertensives (n=78)	
	Number	**%**	**Number**	**%**
Diagnosed with any chronic disease by a physician				
Yes	182	36.4	28	35.9
No	318	63.6	50	64.1
Chronic disease (n=182)				
Hypertension	78	**42.9**	-	-
Cardiovascular disorders	23	**12.6**	8	28.5
Thyroid disorders	23	**12.6**	3	10.7
Diabetes	18	**9.9**	9	32.1
Chronic Obstructive Pulmonary Disease (COPD)	17	**9.4**	4	14.3
Cervical and lumbar hernias	16	**8.8**	-	-
Other (Vertigo, depression and urinary disorders)	7	**3.8**	4	14.3
Total	**182**	**100.0**	**28**	**100.0**

Table 2. General health perception and utilization of health services in hypertensives and non-hypertensives

	Non-hypertensives (n=422)		Hypertensives (n=78)		Total (n=500)		χ^2;p
	Number	**%**	**Number**	**%**	**Number**	**%**	
General health perception							
Good	348	82.5	48	61.5	396	79.2	17.499
Moderate/bad	74	17.5	30	38.5	104	20.8	**p:0.000**
Visits a doctor for check-ups							
Always	19	4.5	8	10.3	27	5.4	5.395
Sometimes	243	57.6	47	60.3	290	58.0	p:0.067
Never	160	37.9	23	29.4	183	36.6	
Medical services used primarily							
Family health center (FHC)	224	53.1	52	66.7	276	55.2	
Public/university hospitals							5.045
Special hoppitals	115	27.3	14	17.9	129	25.8	p:0.080
	83	19.6	12	15.4	95	19.0	
Total	**422**	**100.0**	**78**	**100.0**	**500**	**100.0**	

Table 3. Hypertension prevalence in teachers

	Number	**%**
Measured blood pressure before (n=500)	477	95.4
Diagnosed with hypertension (n=500)	78	15.6
New hypertensives (n=422)	29	6.9
Hypertension prevalence (n=500)	**107**	**21.4**

Blood pressure levels in hypertensives and non-hypertensives

Blood pressure levels in hypertensives and non - hypertensives were given in Table 4. As shown in Table 4, the 53.4% of individuals had normal blood pressure level while 38.6% of were in pre-hypertension level. But in hypertensives pre-hypertension and hypertension levels were significantly higher (P = 0.007).

Table 4. Blood pressure levels in hypertensives and non-hypertensives

Blood pressure levels	Non -hypertensives (n = 422)		Hypertensives (n = 78)		Total (n = 500)		
	No.	**%**	**No.**	**%**	**No.**	**%**	χ^2 / ***P***
Normal	237	56.1	30	38.5	267	53.4	
Pre-hypertension	156	37.0	37	47.4	193	38.6	10.034 /**0.007**
Hypertension	29	6.9	11	14.1	40	8.0	
Total	**422**	**100.0**	**78**	**100.0**	**500**	**100.0**	

Blood pressure levels by demographic and occupatinal characteristics

Blood pressure levels according to socio-demographic and occupational features of teachers were given in Table 5. Our results showed that, none of individuals aged between the 25 – 34 years had high level blood pressure. On the other hand, 16.8% of individuals aged between the 50-64 had significantly higher level of blood pressure ($P < 0.0001$). The 2.4% of women and 10.8% of men had high blood pressure level ($P < 0.0001$). In individuals unmarried or living separately from their partners blood pressure levels were higher than married but this elevation wasn't significant. When blood pressure levels examined according to individuals partners' occupation, we found that blood pressure levels were significantly higher in the 11.8% of whose wife was housewife ($P < 0.0001$). According to organizations and branches of teachers there wasn't significantly difference between blood pressure levels. According to seniority years blood pressure levels showed statistically difference ($P < 0.0001$). Blood pressure levels were high in 7.3% of whose seniority was between the years of 11-20, in 9.2% of whose seniority was between the years of 21-30 and 15.0% of whose seniority was ≥ 31 years.

Table 5. Blood pressure levels by socio-demographic and occupational characteristics

Features	Blood pressure levels							
	Normal (n = 267)		Pre-hypertension (n = 193)		Hypertension (n = 40)		Total (n = 500)	
Age groups	**No.**	**%**	**No.**	**%**	**No.**	**%**	**No.**	**%**
25 - 34 years	70	75.3	23	24.7	0	0.0	93	18.6
35 - 49 years	160	55.6	108	37.5	20	6.9	288	57.6
50 - 64 years	37	31.1	62	52.1	20	16.8	119	23.8
			$\chi^2 = 49.391$		***P* < 0.001**			
Gender								
Men	139	41.9	157	47.3	36	10.8	332	66.4
Women	128	76.2	36	21.4	4	2.4	168	33.6
			$\chi^2 = 53.992$		***P* < 0.001**			
Marital status								
Married	251	54.2	176	38.0	36	7.8	463	92.6
Non - married	16	43.2	17	45.9	4	10.8	37	7.4
			χ^2=1.725	$P = 0.422$				
Occupation of partners								
Educator	114	60.6	62	33.0	12	6.4	188	40.5
Health professional	18	60.0	9	30.0	3	10.0	30	6.5
House - wife	63	39.1	79	49.1	19	11.8	161	34.7
Other sector personnel / self - employed	56	65.9	27	31.8	2	2.3	85	18.3
			χ^2=25.555	***P* <0.001**				
Institutions								
Primary school	140	52.0	107	39.8	22	8.2	269	53.8
Secondary school	127	55.0	86	37.2	18	7.8	231	46.2
			$\chi^2 = 0.432$	$P = 0.806$				
Branches								
Classroom teacher	120	50.4	98	41.2	20	8.4	238	47.6
Branch teacher	147	56.1	95	36.3	20	7.6	262	52.4
			$\chi^2 = 1.629$	$P = 0.443$				
Years of seniority								
1 - 10 years	65	76.5	19	22.4	1	1.2	85	17.0
11 - 20 years	115	56.1	75	36.6	15	7.3	205	41.0
21 - 30 years	66	50.8	52	40.0	12	9.2	130	26.0
31 years and over	21	26.3	47	58.8	12	15.0	80	16.0
			χ^2=44.685	***P* <0.001**				

Blood pressure levels by behavioral health factors

Blood pressure levels according to behavioral health factors of teachers were shown in Table 6. The 25.2% of participants reported that they were current smokers and of these in 33.3% blood pressure was pre-hypertension level, in 11.1% was high. The 23.8% of participants stated that they were using alcohol and in 8.4% of these blood pressure was found to be higher. But according to individuals' smoking and alcohol consumption there wasn't any significant difference between the blood pressure levels. In all group, 48.0% of were overweight / obese and of these in 10.4% blood pressure was significantly higher ($P = 0.002$).

Table 6. Blood pressure levels by behavioral health factors

Smoking status	Blood pressure levels						Total (n = 500)	
	Normal (n = 267)		Pre-hypertension (n = 193)		Hypertension (n = 40)			
	No.	%	No.	%	No.	%	No.	%
Current smokers	70	55.6	42	33.3	14	11.1	126	25.2
Non-smoking	197	52.7	151	40.4	26	7.0	374	74.8
			$\chi^2 = 3.395$	$P = 0.183$				
Using alcohol								
Using	68	57.1	41	34.5	10	8.4	119	23.8
Non-using	199	52.2	152	39.9	30	7.9	381	76.2
			$\chi^2 = 1.137$	$P = 0.566$				
BMI								
Normal	158	60.8	87	33.5	15	5.8	260	52.0
Overweight / obese	109	45.4	106	44.2	25	10.4	240	48.0
			$\chi^2 = 12.583$	***P* = 0.002**				

Factors predicting high blood pressure level

Features effected on blood pressure levels by logistic regression analysis were given in Table 7. The risk of hypertension was 2 - fold higher between the age of 35-49 and 4.5 - fold higher between the age of 50-64 than the 25-34 age groups. The risk of hypertension was 3.5 fold higher in men than in women.

Table 7. Variables predicting high blood pressure levels in logistic regression analysis

Independent variables*	β	p	Odds Ratio	95% CL	
				Lower	Upper
Age groups		**0.000**			
25-34 years	Ref		1		
35-49 years	0.691	**0.013**	1.995	1.154	3.448
50-64 years	1.497	**0.000**	4.468	2.360	8.460
Gender		**0.000**			
Women	Ref		1		
Men	1.256	**0.000**	3.512	2.282	5.406
Constant	-1.765	0.000	0.171		

*Age groups, gender, marital status, occupations of partners', institutions, branches, years of seniority, smoking and alcohol, BMI

Discussion

Hypertension is regarded as a preventable public health problem. Despite increased prevalence of hypertension in many countries, treatment and control rates appear to improve as a result of effective public health strategies and changes in antihypertensive treatment [11-13]. Turkey is one of the countries with a high prevalence of hypertension. According to the results of PatenT - 2 study hypertension prevalence was 30.3% in our country [14]. The current study found that hypertension was highly prevalent (21.4%) among teachers (Table 1-3). In countrywide, some studies reported that hypertension prevalence was between the 2.5%-9.0% among teachers [15,16]. These high rates in Turkish population are likely to be related to dietary habits especially salt intakes. Indeed, in 2008, according to the SALTURK study in our country, the rates of daily sodium consumption and throwing salt without tasting meal was high [14,17,18]. One unanticipated finding was that new hypertensive teachers but they didn't unaware of their condition. A possible explanation for this might be that poor check-ups which was found in Table 2.

On the other hand, in this study, hypertension prevalence was lower than the other countries among teachers Results were shown in Basrah teachers [19] as 21.3% and in Jordanian teachers [20] as 25.2%.

Positive health perception was found to be significantly lower in teachers with hypertension than teachers without hypertension (Table 2). This result is in line with those of previous studies. Indeed, studies showed that among hypertensive individuals positive health perception wasn't widespread and lower health perception was shown to be associated with poor disease information [21, 22].

In the study group, visits a doctor for check-up was low. However, this rate was 10.3% in teachers with hypertension and higher according to non-hypertensives (Table 2). Also a study conducted in our country showed low rates (about 20.0%) in our society [23]. This result may be explained by the fact that consulting to doctors without experience any health problem hadn't acquired a health behavior even in educators.

Pre-hypertension blood pressure level was found to be prominently (37.0%) in our study What is surprising is that approximately 80.0% of hypertensives were under the treatment although less than half had normal blood pressure level (Table 4). These findings are rather disappointing. The present results are significant in at least

two major respects. First one, to reduce the prevalence of hypertension, target group should be the individuals with pre-hypertension. Second one, routine screening and controlling treatment compliance should be required in school environment. In the study group, mean blood pressure was determined to be < 140/90 mmHg. Indeed, the results of PatenT - 2 study showed same results in Turkish society [14].

It is stated that the inevitable rise in blood pressure due to structural changes in arterial and arteriolar as a result of the aging [24]. In this study, in 50-64 age group had higher levels of blood pressure, the risk of high blood pressure was found to be 5.4 times higher (Table 5-7). Indeed, in studies conducted in our country and abroad had been found to increase blood pressure levels with increasing age [14,25-28].

It had been reported that in the early stages of life between the gender there was no an important difference in terms of blood pressure even though with the beginning of adolescence in men it watched at high levels [29]. Contrary to prior studies conducted in different cities of Turkey [27, 30, 31] in this study, the rates of men with high levels of blood pressure was higher than the women, the risk of high blood pressure was 3.5 fold in men (Table 5-7). A possible explanation for this might be that men tend towards unhealthy behaviors such as smoking, alcohol, high BMI than women.

Working conditions, occupation of the partners are the trigger psychosocial factors that contributing worst health outcomes and increased blood pressure levels [32]. In this study, blood pressure was determined to be higher in whose partner wasn't working and in whose seniority over the 31 years (Table 5). Generational conflict, mobbing and monotonous in educational services may stressor factors on blood pressure during long seniority. Therefore, stress management strategies can be useful to control blood pressure.

Tobacco is often consumed in combination with alcohol, and this creates multiple risk factors for high blood pressure. It has been thought that influence of blood pressure could be connected to the the activation of the sympathetic nervous system or transportation of cellular electrolyties [33]. In our study, high blood pressure levels were found in current smokers and alcohol users, nonetheless this elevation weren't significant. This result give an impression that effects of smoking on blood pressure was not predominantly. Obesity is said to leads hypertension by increasing renal reabsorption of sodium [34]. Nearly half of the participants were overweight / obese and blood pressure levels in these people were significantly higher (Table 6). Similar results were shown in many studies which showed the relationship between the obesity and high blood pressure levels [35-37].

Conclusion

The present study makes several noteworthy contributions to teachers' health. A key strength of the present study was that, one of every five teachers working in primary - secondary levels were hypertensive. Among hypertensives 6.9% of didn't aware about their status. Approximately one-third of teachers were pre-hypertensive. This is an important issue for future research to remember that teachers are specific groups of physical health problems. Ensuring appropriate primary care systems and public health services for teachers should be a priority in hypertension. Practical implications should focus on early medical inventions and promotional activities for lifestyle changes. Firstly, postgraduate health promotion training should be arranged for candidate teachers. Secondly, due to long hard-working conditions of teachers early diagnosis services should lay at school environments within the primary care.

Limitation

This was a single-center study based on primary and secondary school teachers. Examination of blood pressure levels should be done in all levels of schools. On the other side, achieving a large population from 36 schools in the province was the strong points of this study.

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References

1. Chockalingam A, Campbell NR, Fodor JG. Worldwide epidemic of hypertension. Can J Cardiol. 2006; 22(7):553-5.
2. A global brief on Hypertension: Silent killer, global public health crisis. Geneva: World Health Organization; 2013;7-19.
3. Cheung BMY, Cheung TT. Nice new hypertension guidelines. World J Hypertens. 2012;23;2(5):45-9.
4. Raised Blood Pressure. Global Health Observatory. Geneva: World Health Organization; 2013. http://www.who.int/gho/ncd/ris access date 15.05.2013
5. High Blood Pressure: American Heart Association 2013. http://heart.org/idc/groups/heartpublic/@wcm/@sop/@smd/documents/downloadable/ucm_ 319587. pdf access date 05.05.2013

6. Onat A: Türk toplumunda kan basıncı ve hipertansiyon, 2009. http://tekharf.org/2009.html access date 05.11.2012

7. Kovess-Masféty V, Sevilla-Dedieu C, Rios-Seidel C, Nerrière E, Chee CC. Do teachers have more health problems? Results from a French crosssectional survey. BMC Public Health. 2006;6(101):1-13.

8. Seibt R, Lützkendorf L, Thinschmidt M. Risk factors and resources of work ability in teachers and office workers. Int Cong Ser. 2005;1280:310-5.

9. JNC-7 Express: The Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure. U.S. Department of Health and Human Services;2003;2-3.

10. Diet, nutrition and the prevention of chronic diseases: report of a joint WHO/FAO expert consultation. WHO technical report series 916. WHO Library Cataloguing-in-Publication Data. 2003;13-81.

11. Chiong JR. Controlling hypertension from a public health perspective. Int J Cardiol. 2008;127 (2):151-6.

12. Fasce E, Campos I, Ibáñez P, Flores M, Zárate H, Román O, Fasce F. Trends in prevalence, awareness, treatment and control of hypertension in urban communities in Chile. J Hypertens. 2007;25 (9):1807-11.

13. Onysko J, Maxwell C, Eliasziw M, Zhang JX, Johansen H, Campbell NR. Canadian Hypertension Education Program. Large increases in hypertension diagnosis and treatment in Canada after a healthcare professional education program. Hypertension. 2006;48: 853-60.

14. Turkish Hypertension Prevalance Study -2 (PatenT2). Turkish Hypertension and Kidney Disease Society 2012. http://www.turkhipertansiyon.o... PatenT2.ppt access date 13.05.2013.

15. Tokuc B, Berberoglu U. Health promoting lifestyles among primary school teachers working in Edirne. TAF Preventive Medicine Bulletin. 2007;6 (6):421-6.

16. Balci E, Gun I. Evaluation of teacher satisfaction on delivery of health care who working in Kayseri. Erciyes Medical Journal. 2011;33(2):129-40.

17. Erdem Y, Arici M, Altun B, Turgan C, Sindel S, Erbay B, Derici U, Karatan O, Hasanoglu E, Caglar S. The relationship between hypertension and salt intake in Turkish population: SALTURK study. Blood Press. 2010;19(5):313-8.

18. Unal B, Ergor G, Horasan G, Kalaca S, Sozmen K. Turkey Chronic Diseases and Risk Factors Prevalance Study. T.C. Ministry of Health, Turkey Public Health Institution. http://sbu.saglik.gov.tr/Ekutu... khrfat.pdf, access date 20.02.2014

19. Ali HA, Al-Asadi JN. Prevalence and lifestyle determinants of hypertension among secondary school female teachers in Basrah. The Medical Journal of Basrah University. 2009;27(2):90-4.

20. Ibrahim NKR, Hijazi NA, Al-Bar AA. Prevalence and determinants of prehypertension and hypertension among preparatory and secondary school teachers in Jeddah. J Egypt Public Health Assoc. 2008;83(3):183-203.

21. Altun B, Arıcı M, Nergizoğlu G, Derici U, Karatan O, Turgan C, Sindel S, Erbay B, Hasanoğlu E, Cağlar S, Turkish Society of Hypertension and Renal Diseases. Prevalence, awareness, treatment and control of hypertension in Turkey (the PatenT study) in 2003. J Hypertens. 2005;23(10):1817-23.

22. Sudore RL, Yaffe K, Satterfield S, Harris TB, Mehta KM, Simonsick EM, Newman AB, Rosano C, Rooks R, Rubin SM, Ayonayon HN, Schillinger D. Limited literacy and mortality in the elderly: The Health, Aging, and Body Composition Study. J Gen Intern Med. 2006;21(8):806-12.

23. Dündar PE, Dede B. Health literacy and affected factors in selected adults living urban and rural regions in Manisa. XV. National Public Health Congress Proceeding Book, s 296-299, 2-6 Ekim 2012, Uludağ University, Bursa.

24. Pinto E. Blood pressure and ageing. Postgrad Med J. 2007;83(976):109-14.

25. Doğan N, Toprak D, Demir S. Hypertension prevalence and risk factors among adult population in Afyonkarahisar region: a cross-sectional research. Anatol J Cardiol. 2012;12(1):47-52.

26. Erem C, Hacihasanoglu A, Kocak M, Deger O, Topbas M. Prevalence of prehypertension and hypertension and associated risk factors among Turkish adults: Trabzon Hypertension Study. J Public Health. 2008;31(1):47-58.

27. Ozturk A, Aykut M, Günay O, Gun İ, Ozdemir M, Çıtıl R, Ozturk Y. Prevalence and factors affecting of hypertension in adults aged 30 years and over in Kayseri Province. Erciyes Medical Journal. 2011;33(3):219-28.

28. Oliveira GF, Oliveira TRR, Ikejiri AT, Andraus MP, Galvao TF, Silva MT, Pereira MG. Prevalance of hypertension and associated factors in an indigeneous community of central Brazil: A population-based study. PLoS One. 2014;9(1):1-6.

29. Hypertension control: Report of a WHO Expert Commmittee. WHO Technical Report Series 862. World Health Organization, 1996.

30. Güneş G, Pehlivan E. Malatya Yeşilyurt Sağlık Ocağı Bölgesinde 40 Yaş ve Üzeri Nüfusda Hipertansiyon Prevalansı ve Bazı Risk Faktörlerinin Saptanması. Klinik Bilimler ve Doktor Dergisi. 1998;4(3):375-9.

31. Açık Y, Sezer E, Sezer H. Frequency and distribution of risk factors for coronary heart disease in the adult population of rural district of Elazığ, Turkey. Turk J Med Sci. 1999;29(3):265-72.

32. Rogers RG, Everett BG, Saint-Onge JM, Krueger PM. Social, behavioral, and biological factors, and sex differences in mortality. Demography. 2010;47(3):555-78.

33. Mancia G, Grassi G. Definition and Classification of Blood Pressure, Kozan O (Edt), First. Press. Istanbul: European Medical Bookselling 2009;15-22.

34. Mansia G, Grassi G, Kjeldsen SE. Manual of Hypertension of the European Society of Hypertension. Informa UK Ltd, London 2008;24-281.

35. Çöl M, Özdemir O, Ocaktan ME. Treatment-control situations and behavioral factors on hypertensives over 35 years of age at Park Health Center region. Journal of Ankara University Faculty of Medicine. 2006;59(4):144-50.

36. Sanne S, Muntner P, Kawasaki L, Hyre A, DeSalvo KB. Hypertension knowledge among patients from an urban clinic. Ethn Dis. 2008;18(1):42-7.

37. Viera AJ, Cohen LW, Mitchell MC, Sloane PD. High blood pressure knowledge among primary care patients with known hypertension: A North Carolina Family Medicine Research Network (NC-FM-RN) Study. J Am Board Fam Med. 2008;21(4):300-8.