Is the Halves Rule of Hypertension Valid in Edirne, Turkey?

Edirne'de Hipertansiyondaki Yarımlar Kuralı Geçerli mi?

Bektaş Murat YALÇIN, MD,[a]
Erkan Melih ŞAHİN, MD[b]

[a]Department of Family Practice, Ondokuz Mayıs University Faculty of Medicine, Samsun
[b]Department of Family Practice, Onsekiz Mart University Faculty of Medicine, Çanakkale

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Yazışma Adresi/*Correspondence:*
Bektaş Murat YALÇIN
Ondokuz Mayıs University
Faculty of Medicine,
Department of Family Practice,
Samsun,
TÜRKİYE/TURKEY
myalcin@omü.edu.tr

ABSTRACT Objectives: We aimed to find out the validity of the "halves rule of hypertension" and the efficacy of the life style modifications in management of hypertension in Edirne city. **Material and Methods:** We searched certain socio-economic and demographic features, physical activity levels, and some life style features of the 1936 subjects representing the population between 18-65 years in Edirne All of the subjects' systolic and diastolic blood pressures were measured. Utilization of health care services and details about their anti-hypertensive treatments were noted in subjects who were diagnosed as hypertensives before. **Results:** Among 1936 subjects, 275 (14.2%) had high blood pressure detected new (Unaware) and 249 of them (12.8%) were diagnosed as a hypertension patient before (Aware). Thre was no difference between two groups about their socioeconomical status, education year, smoking and alcohol consumption, and physical activity levels. Of the aware subjects 209 (83.9%) were receiving anti-hypertensive medication while 70 of them (28.1%) had optimum blood pressure levels. The mean systolic blood pressure was 4.5 mmHg and diastolic blood pressure was 3.4 mmHg lower in aware patients. There was no difference between the mean blood pressure measurements of the aware patients who were receiving medical treatment and adapting life style modifications compared with the other aware patients. There was no statistically difference between social economical status, educational year, smoking status and alchol consumption of these two groups (aware and unaware). **Conclusion:** It can be presumed that the halves rule of hypertension is valid in Edirne oppurtunistic blood pressure measurements and efficacy of the pharmacological therapy and the life style factor modification for hypertension patients must be increased among primary care.

Key Words: Hypertension, health promotion, primary health care

ÖZET Amaç: Bu çalışmada Edirne'de hipertansiyondaki yarımlar kuralının geçerliliği ve hipertansiyon yönetiminde yaşam tarzı değişikliklerinin etkinliği araştırılmıştır. **Gereç ve Yöntemler:** Edirne'de 18-65 yaşları arasındaki popülasyonu temsil eden 1936 olguda hipertansiyonla ilişkilendirilmiş çeşitli sosyoekonomik ve demografik özellikler, fiziksel aktivite düzeyleri araştırılmıştır. Tüm olguların sistolik ve diyastolik kan basınçları ölçülmüş, daha önceden hipertansiyon tanısı almış olguların aldıkları sağlık hizmetleri, kullandıkları antihipertansif tedaviler araştırılmıştır. **Bulgular:** 1936 olgudan, 275 (%14.2)'inin kan basıncı yeni yüksek olarak bulunurken (farkında değil), 249 (%12.8) olgu daha önceden hipertansiyon tanısı almıştı. Hipertansiyon tanısı alan olguların 209 (%83.9)'u en az bir antihipertansif ilaç kullanıyorken, 70 (%28.1)'inin kan basıncı regüleydi. Hasta olduğunun farkında olan olguların farkında olmayanlara göre ortalama sistolik basınçları 4.5 mm Hg ve diyastolik kan basınçları 3.4 mmHg daha düşüktü. Medikal tedavi alan ve yaşam tarzı değişikliklerini uygulayan tanı almış hastaların kan basınçları ile diğer farkında hastalar arasında bir fark bulunamadı. Her iki grup arasında sosyoekonomik durum, eğitim yılı, sigara ve alkol tüketimi açısından istatistiksel bir fark bulunamadı. **Sonuç:** Edirne'de tedavi alma hariç, hipertansiyondaki yarımlar kuralı geçerli olabilir. Birinci basamakta fırsatçı kan basıncı ölçümleri ve hipertansiyon hastaları için farmakolojik terapi ve yaşam tarzı değişiklilerinin etkinliği arttırılmalıdır.

Anahtar Kelimeler: Hipertansiyon, sağlığın geliştirilmesi, birinci basamak sağlık bakımı

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World Health Organization (WHO) had announced that cardiovascular diseases were the reason for the total one third of the global deaths in the year 1999. By the year 2010, cardiovascular diseases are estimated to be the leading cause of death in developing countries.[1] WHO has declared three strategic priorities for preventing cardiovascular diseases; i) to reduce cardiovascular diseases risk factors and their determinants effectively, ii) to develop cost effective and equitable health care innovations for management of cardiovascular diseases, iii) to monitorize the trends of cardiovascular diseases and the related risk factors. One of the cornerstones of the primary prevention of cardiovascular disease has been screening and treatment of patients (antihypertensive drugs and life style modifications) with high blood pressure. Nevertheless, recent population studies have shown that awareness and management of high blood pressure is far from optimal.[2] An artificial rule 'The Halves Rule' is used to define this situation that indicates the poorly managed hypertension (Diagnose, treatment, follow up).[3] According to this rule, half of the all hypertensive patients could be diagnosed, within half of them could receive medication and the half of the medicated patients have regular blood pressure levels. There are many estimated reasons for halves rule.[4-8] The lack of having routine blood pressure controls and understanding the related risks of the high blood pressure, underestimation of mild and medium levels of hypertension, discordance to the life style modifications and treatment, the organization problems of health care systems are some of the reasons considered for this artificial rule.

In this cross-sectional study we aimed to find out the prevalence of hypertension, certain risk factors, diagnosing rate of hypertension disease, features of treatment (i.e. drugs and life style modification) and health care services provided to these patients with hypertension in order to examine whether "the halves rule" is valid in our region.

METHODS

THE STUDY DESIGN

The method of this study is told in somewhere else.[9] This cross-sectional descriptive study was held between January and March 2001 in Edirne city, Turkey. Edirne has a population of nearly 110.000, located at the borders of Bulgaria and Greece with Turkey. The population we studied were 87.143 people aged between 18-65 years living in the urban and central rural Edirne This population was divided into 57 groups (45 urban, 12 rural) of known geographic borders and population counts. All of these groups were accepted as homogeneous. Subjects were selected randomly from these groups in numbers weighted to their population. 1948 subjects were selected by multi-stage sampling method using the population reports of local governmental health office for year 2000. None of the subjects refused to participate in the study but 12 (0.6%) pregnant subjects were excluded omitted from the study because of their waist circumference might not reflect obesity. The remaining 1936 subjects were accepted as main study group. Before the study, permission of the Trakya University Ethics Committee was granted (TÜBAP 314).

DATA COLLECTION

Data collection was carried out by face-to-face interviews at homes and worksites of the subjects by the researchers. All of the participants were informed briefly about the main frame of the study and their informed consent was granted. All of the participants demographic features, socio-economic statues, relevant personal and family history data about hypertension, smoking habits and nicotine dependency, alcohol use and dependency, frequency and intensity of regular physical exercises and physical activity level were interviewed using a questionnaire.[10] Subjects were categorized as smokers, non-smokers, or ex-smokers regarding their tobacco usage, and as users or non-users regarding their alcohol usage. The physical activity of the subjects was classified according to the scale developed by Onat and Sansoy.[11] The subjects who exercised for 30 minutes at least three times in a week are accepted as regular exercisers. The subjects' physical activity levels groups were labeled as levels L1 to L4 in increasing order calculated according to their daily walking distance, their occupation and exercise levels.

SUBJECTS

Among 1936 subjects a total of 524 subjects in two groups (i.e aware of hypertension and i.e unaware of hypertension) were accepted as the main study population. The conditions to define the aware hypertensive subjects were as follows; i) to have systolic blood pressure (SBP) ≥140 mm Hg with/or diastolic blood pressure (DBP) ≥90 mm Hg measured at least three different times by a health professional ii) has been followed up as a hypertension patient, iii) using anti-hypertensive medication. The unaware group was consisting of the subjects who had SBP above 140 mmHg with/or DBP above 90 mmHg in two measurements with half an hour interval. The blood pressures of the subjects were measured according to the recommendations of the British Hypertension Society criteria.[12] All of the blood pressures were classified according to the criteria by the report of JNC VII.[13] The aware hypertensive subjects were also asked about certain health promotion activities including follow up system, recommended life style modifications and characteristics of their anti-hypertensive medications.

STATISTICAL ANALYSIS

All of the analysis were performed using SSPS (Statistical Package for Social Sciences version 10.0). Chi-Square test, Pearson correlation test, Independent samples-t test, One-way Anova tests were used to investigate the relations between the groups. A p value of $p< 0.05$ was accepted as significant.

RESULTS

The general demographic data of the whole study population are shown in Table 1. Among 524 (27.0%) subjects whom 275 (14.2%) had high blood pressure detected new (i.e. unaware of their dis-

TABLE 1: The demographic characteristics of the study population.

		Unaware Group	Aware Group	
Number		275	249	**p**
Gender	Women	171 (62.0%)	105 (42.2.0%)	x^2= 14.002
	Men	104 (38.0%)	144 (57.8%)	p< 0.001
Age (mean years)		47.083±10.52	52.58 ± 9.34	t= 6.300
(min 18, max.65)				p< 0.001
Habitation	Urban	248 (90.2%)	206 (82.7%)	x^2= 1.449
				p= 0.229
	Rural	27 (9.8%)	43 (17.3%)	
Education Status	Literate	47 (3.5%)	24 (4.6%)	x^2= 1.245
	Illiterate	21 (1.1%)	19 (3.6%)	p= 0. 231
	Admitted to a school	207 (95.4%)	213 (91.7%)	
Education Year (mean) *		10.021±14.95 years	11.78 ± 20.05 years	t= 1.146
(min 1, max.18)				p= 0.252
Maritual Status	Married	239 (86.96%)	200 (80.3%)	
	Divorced	17 (6.2%)	5 (2.0%)	
	Widow	15 (5.5%)	41 (16.5%)	x^2= 2.782
	Single	4 (1.5 %)	3 (1.2 %)	p= 0. 145
Socio Economical Status	Well	23 (8.4%)	31 (12.4%)	
	Medium	61 (22.2%)	95 (38.2%)	x^2= 27.638
	Low	89 (32.4%)	82 (32.9%)	p< 0.001
	Very Low	102 (37.13%)	41 (16.5%)	
Social Security Coverage	Not covered	27 (9.8%)	13 (5.2%)	x^2= 2.121
	State organizations	246 (89.5%)	234 (94.0%)	p= 0.751
	Private assurance	2 (0.7%)	2 (0.8)	

*In the participants who had admitted to a school.

ease) and 249 (12.8%) were diagnosed and followed up as hypertension patients (i.e. aware of their disease). The mean and SD of the aware and unaware hypertension patients SBP and DBP measurements are shown in Table 2. There was a linear correlation between SBP and DBP (R= 0.663, p< 0.001) in all groups. Aware subjects' SBP was 147.33 mm Hg and DBP was 88.18 mm Hg while unaware subjects SBP was 151.83 mm Hg and DBP was 91.58 mm Hg. Aware subjects' SBP was 4.5 mm Hg (and DBP was 3.4 mm Hg lower than the unaware group. Of the aware hypertension patients 70 (28.1%) had regulated blood pressures.

The diagnosis of the hypertension patients were settled 72.22 ± 63.84 months (min: 1 max: 360 months) ago. Of the unaware subjects, 50.9% of the unaware subjects never got regular blood pressure measurements (n= 242, 97.2%). The awareness of hypertension had an increasing ratio with the age groups as shown in Figure 1.

DRUG THERAPY

Of the aware hypertension patients 209 (83.9%) were using at least one anti-hypertensive drug while 31 (14.8%) of them were using combined drug therapy. The number of the subjects who were not using any medication was 40 (16.1%), while 10 of them had been given up their medication by their own decision. The drug therapy didn't cause a difference between SBP (p= 0.066) and DBP (p= 0.081) in aware subjects. A large group of patients didn't know the name or class of the drug they were using (n= 49, 19.7%). Also many patients were not receiving their medication with the recommended anti-hypertensive doses (26.9% of them were recieveing above while 1.7% of them were at low doses). Drug recommendations of patients were changed 1.08±1.50 (min: 0, max: 6) times. The physicians only gave 19.5% of the patients an explanation for the reason of their drug change. The most known reason for the change of medication was improper blood pressure control (66.1%) followed by the side effects of the drugs for 8.5%. The physicians only informed 6.5% of the patients about the possible side effects of their medication.

TABLE 2: The SBP and DBP measurements of the aware and unaware hypertension patients.

	Aware		Unaware		
	Mean	SD	Mean	SD	p
SBP	147.33	21.34	151.38	25.12	p= 0.008 t= 2,651
DBP	88.18	10.54	91.22	32.14	p= 0.002 t= 3,105

SBP: Systolic blood pressure, DBP: Diastolic blood pressure.

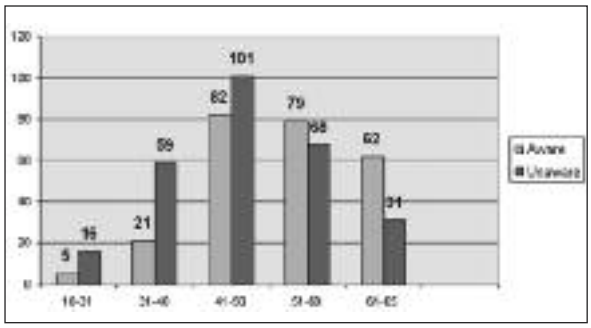

FIGURE 1: The aware and unaware groups according to age.

HEALTH PROMOTION

The investigated life style factors of subjects in both groups are showed in Table 3. 116 (46.2%) of the aware hypertension patients claimed that they had been informed about their disease and 82 (70.7%) of them apprized it as satisfactory and useful. 197 out of 249 patients (79.1%) were recommended a life style change at least once but only 130 (66.0%) of them declared to get satisfactory information about the content of this life style modification. Salt restriction was the most frequent life style modification recommended to the aware hypertensive patients. It was recommended to 223 (89.6%) of them. Most of them (179, 70.7%) claimed that they are tring to limit salt in take, while 54 (21.7%) were obeying a strict salt-free diet, and 19 (7.6%) of them reported that they did not obey any salt restriction. Response of the patients to the salt restriction did not cause a significant alteration in their SBP (F= 1.245, p= 0.704) or DBP (F= 2.657, p = 0.110).

In the aware group, 12 (26.1%) patients had quitted smoking (from total of 46 ex-smoker) after

TABLE 3: The investigated life style factors in study groups.

		Unaware		Aware		
Smoking Status	Smoker	124 (45.1%)		138 (55.4%)		x^2= 0,648 p= 0,421
	Never Smoker	34 (12.4%)		46 (18.5%)		
	Ex-Smoker	117 (42.5%)		65 (26.1%)		
Alcohol	User	197 (71.6%)		222 (89.1%)		x^2= 1.126
	Non-user	78 (28.4%)		27 (10.9%)		p= 0.124
Regular Exercise (≥ 3 times a week)	80 (29.1%)	54 (21.7%)		x^2= 3,764		p= 0.052
Physical Activity Level						
Sedentary	L1: very low	119 (43.3%)	225	136 (54.6%)	211	x^2 = 7.256 p= 0.064
	L2: low	106 (38.5%)	(81.8%)	75 (30.1%)	(84.7%)	
Active	L3: medium	28 (10.2%)	50	24 (9.62%)	36	
	L4: high	22 (8.0%)	(18.2%)	14 (5.6%)	(15.3%)	

being diagnosed of hypertension and rate of quittance is higher among patients than unaware subjects (x^2= 9.847, p< 0.001). In these patients, smoking status didn't cause a significant alteration of SBP (F= 1,115 p= 0.745) or DBP (F= 1,021 p= 0.325). Most of the subjects in both groups preferred jogging (n= 86, 64.0%) as an exercise type. In aware patients sedantary life style didn't not cause a significant alteration of the SBP (t= 1.231 p= 0.660) or DBP (t= 0.984, p= 0.064).

DISCUSSION

In this cross-sectional study, which represents the adult population of Edirne, between the ages of 18-65 years, the awareness ratio of hypertension, is found 47.5%. In AYDINHIP study, Sönmez had found this ratio as 57.9%.[14] In a review study Marques-Vidal et al. have reported that the awareness ratio is found in a very wide range between in males 23% and 93% in females 28% and 97% accordantly to the previous studies.[7] Since hypertension is asymptomatic, oppurtunistic regular measurements are seemed to be the only ideal strategy to detect the hypertensives early.[15] In British Hypertension Society Guidelines for Hypertension Management in 2004 it has been recommended that every adult should have their blood pressure measured routinely at least every five years until the age of 80 years and those who have had high readings (135-139/85-89 mmHg) at any time previously should have their blood pressure re-measured annually.[16] However American Board of Family Physcians reveals that every patient's blood pressure should be checked anually after the age of 18 in their periodic examinations.[17] Because of the well-known 'silent killer' nature of the hypertension, the diagnoses of asymptomatic disease critically delays. This fact is confirmed in our study, as the mean age of the aware patients were significantly higher than the unaware group. That is probably related to the increases in the frequency of the total doctor visits, as the patients were getting older. The total number of the aware patients could overcome the new detected high blood pressure patients only in the fifth decades. There may be several reasons for this result. Physicians may belive that hypertesion is an elderly disease and don't feel measuring younger patients' blood pressures as a neccesity. Therefore the awareness ratio is 48.1% in our patients younger than 50 years old. It can

be presumed that critical and effective periods of interference for these patients are missing. Ratios of premature death from cardiovascular diseases were nearly at the same level in Turkey compared to the European countries although the mean age of Turkish population is much younger than them.[18]

As Marques noticed females have a better awareness ratio like we have observed in this study.[7] It is assumed that females use health care systems more frequently than males. Many of the differences in diagnosis rate is due to demographic features like age, gender and habitation region, depend on the health care utilization rates.[7] This reflects the lack of efficacy and equitably of preventive health care services. It is well known that life style recommendations about smoking, alcohol usage, physical activity levels, potassium rich diet intake, weight regulation, salt restriction are natural and free health promotion activities.[19] Not only supplementary to medical treatment, but also alone, they are important for hypertensives and prehypertensives in order to achieve maximum blood pressure decrease as recommended in JNC VII.[13] In our study, the aware group did not show any difference from the unaware group in terms of life style factors like regular physical exercise, physical activity levels and alcohol consumption. Also our data did not confirm a significant relation between blood pressure and salt restriction or physical activity level. Although many of our patients (82.0%) got salt restriction recommendation, the ratio of strict restriction was low. In case-control studies the relation of salt restriction and physical activity level with blood pressure is well studied but in epidemiological studies supportive results are rare.[20] While smoking and alcohol consumption could be confirmed by valid objective scalas, some other life style features like salt restriction and physical activity levels are depending on self-reports so a probable relation in our study might be masked.[21,22] As an encouraging point, 26.0% of the smokers had quitted smoking after they were diagnosed as hypertensives. Because of the predominance of the sedentary life style among our subjects another important health promotion activity should be increasing the physical activity levels and regular exercise.

In our study, the ratio of the medicated patients was lower than the results of the TEKHARF study. In AYDINHIP study, this ratio is found 73.3% and 19.8% of the patients has regulated blood pressure levels.[14] In our study 70 (28.1%) subjects had regulated blood pressure. There are many reasons for unsuccesful medication for hypertension.[23] This problem is addressed to the irregular use of medication and poor compliance of the patients and we believe this statement is valid in our subjects too.[24] Doctor-patient relationship is an important factor for treatment as doctors have tendency to fail to acknowledge their patients about the disease medication or their side effects. In our study, the patients' medication had been changed at least once and many of them didn't get an explanation for it. It seems like, most of the physicians preferred to start a new anti-hypertensive drug immediately when they started to organize the treatment of their new patients rather to consider the efficacy of the previous one. Also 25% of the patients were receiving their medication above the referred pharmacological dosage, while 10 (25%) of the non-medicated hypertensive patients claimed that they had stopped their medication by themselves because of the side effects of their last antihypertensive. The medication protocols of many subjects were needed to be re-organized.

Our study may have some limitations in data gathering like all cross-sectional studies. Although the researchers had been trained by a standardized protocol of blood pressure measurements, all of the estimations are made in one-occasion measurements and second measurements were taken only if the blood pressure detected to be high.[25,26] The follow up data were not confirmed in the entire group to define them as hypertensives. Of course single visit may lead to wrong estimation of the ratio of clinically detected subjects as well as the number of the regulated hypertensives. White-coat hypertension is another aspect. In order to avoid this problem we measured the blood pressures of the participants twice.

It can be presumed that halves rule is valid in our region despite the high ratio of the patients who were receiving anti-hypertensive medication. Opurtunistic blood pressure measurements and efficacy of the pharmacological therapy and the life style factor modification for hypertension patients must be increased among primary care.

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