Pak Heart J

THE EFFECT OF DIFFERENT BODY POSITIONS AND SPEECH ON BLOOD PRESSURE IN HYPERTENSION PATIENTS

Sidika Oguz[1], Derya Karabas[2]

[1-2]Marmara University, Health Science Faculty, Nursing department. Istanbul-Turkey

Address for Correspondence:

Sidika Oguz

Marmara University, Health Science Faculty, Nursing department. Istanbul-Turkey

E-mail: sidikaoguz@yahoo.com

Date Received: June 10,2016
Date Revised: December 18, 2016
Date Accepted: December 27,2016

Contribution

SO conceived the idea, planned the study and drafted the manuscript. DK collected data, did statical analysis. SO drafted the manuscript and critically reviewed manuscript. All authors contributed significantly to the submitted manuscript.

All authors declare no conflict of interest.

This article may be cited as: Oguz S, Karabas D The effect of different body positions and speech on blood pressure in hypertension patients Pak Heart J 2017; 50 (02): 65-70.

ABSTRACT

Objective: To determine the effect of different body positions and speech on blood pressure (BP) in patients with hypertension.

Methodology: This cross sectional study was performed from February 2011 to June 2011. Ten percent of the total annual number of patients who received treatment for hypertension either at the hypertension polyclinic or on inpatient basis at the cardiology clinic were included. Patients previously diagnosed with hypertension (BP>140-90 mmHg), aged 18 years and above were included. The data was collected by a questionnaire and blood pressure measurements were documented. Aneroid sphygmomanometer was used for BP pressure measurements. Measurements were made in a certain order, i.e. while the patients were sitting, speaking, in supine position and in supine position with the feet crossed at the ankles. The measurements were taken from the right and left arms, three minutes apart. The data were evaluated using percentage, frequency and One-way Anova test. Statistical significance was set at $p<.05$.

Results: Total of 162 patients were included. No differences were seen between the BP measurements taken from the right and left arms in the different positions ($p> .05$). For the BP measurements performed in the right arm, diastolic blood pressure (DBP) was the lowest in the supine position (72.8 ± 12) and highest while speaking (77.1 ± 13.3) ($p=.003$). For the BP measurements performed in the left arm, DBP was the lowest in the supine position (72.7 ± 11) and highest in the sitting position (76 ± 12.3) ($p=.021$).

Conclusion: Systolic blood pressure (SBP) did not differ much with body position. On the other hand, DBP was higher while speaking when BP was measured in the right arm, whereas DBP was higher in the sitting position when BP was measured in the left arm.

Key Words: Blood pressure, speaking, sitting position, supine position, feet crossed at the ankles, nursing

INTRODUCTION

Hypertension (HT) is a significant healthcare problem associated with major morbidity and mortality. It is responsible for 5% of adult deaths worldwide. It affects one-fourth of the world population, corresponding approximately one billion people, and leads to target organ damage.[1,2] HT is also a risk factor for myocardial infarction, heart failure, stroke and renal diseases. According to the World Health Organization report, high blood pressure is a leading cause of death worldwide.[2]

Effective management of hypertension requires, in the first place, an accurate diagnosis. Blood pressure (BP) measurement is an important determinant in diagnosing hypertension. Availability of the necessary equipment and environmental conditions, and measurement with a correct technique is required for diagnosing hypertension.[3] Blood pressure measurements are typically performed by nurses in clinical and outpatient settings. The objective of a nurse in caring a hypertensive patient should involve reducing and controlling blood pressure without adverse effects. In achieving this, nurses have several roles and responsibilities, which covers all aspects of hypertension management and includes diagnosing, follow-up, drug management, patient education, counseling, care planning and care giving.[1-4]

In daily practice, blood pressure measurement should be performed with indirect method, using blood pressure measuring devices (sphygmomanometer) known to comply with the standard criteria. Three types of manometers, mercuric, aneroid and electronic, are used. Failure to respect privacy during blood pressure measurement may lead to an increased anxiety, which in turn may alter blood pressure readings. Besides, patients should be instructed not to speak during blood pressure measurement.[3] It has been emphasized that environmental factors including noise (people talking, music, television), excessive heat or cold, or smoking, drinking tea, coffee, caffeine-containing drinks and overeating 30 minutes before measurement affect blood pressure measurements and that such factors should be controlled during measurements.[2-4] Any problem originating from the patients, environment or from the person performing the measurement may affect the accuracy of the blood pressure measurement. Precise measurements are very important to be able to evaluate the absolute risk of possible future cardiovascular events and to guide the treatment of hypertension.[1]

METHODOLOGY

This descriptive cross sectional to determine the effect of different body positions and speech on blood preasure in patients with hypertension was performed from February to June 2011. Patients who were receiving treatment for hypertension either by the hypertension outpatient polyclinic or on inpatient basis in the Cardiology Clinic at Istanbul University Cerrahpasa Medical Faculty Hospital were included. Faculty Nursing Department were included. Patients were selected using the simple random sampling method. The number of patients to be included in the research was calculated by a specialized statistician as 10% of the total number of patients who were treated in the cardiology polyclinic and clinics during one year.

Patients diagnosed with hypertension (BP>140-90mmHg) who were aged 18 years and older, having no communication problems, did not drink tea or coffee or smoke in the 30 minutes preceding the measurement, and volunteered to participate in the study were included. The patients were asked to complete the questionnaires first. This was followed by blood pressure measurements, the results of which were documented. The questionnaire form covers patients' sociodemographic characteristics, disease variables (BMI, other existing heath conditions, disease duration etc.). The questionnaire form was completed, using a face-to-face interview method, in a quiet room. Same approach was followed for the inpatients in the cardiology clinic. Blood pressure measurements were taken while the patients were sitting, speaking, in supine position and in supine position with the feet crossed at the ankles, first from the right arm, then from the left arm. Blood pressure measurements were performed using a calibrated aneroid sphygmomanometer.

The first measurement in the cardiology outpatient clinic was taken in a quiet room. Patients were seated in a comfortable chair with back support, with their feet placed parallel on the floor. Blood pressure was measured first from the right, then from the left arm, 3 minutes apart. For systolic and diastolic blood pressures, Korotkoff phase 1 (appearance of the sound) and Korotkoff phase 5 (disappearance of the sound) were taken as reference. For the second measurement, the patients were made to speak about their general condition, again at the sitting position, and measurements from the right and left arms were taken. For the third measurement, the patients were in supine position in a room. The arm used for measurement was supported at the midline of the sternum with a small cushion. Blood pressure measurements were made first from the right, then from the left arm. For the fourth measurement, the patients were placed in supine position with the feet crossed at the ankles. The arm used for measurement was again supported at the midline of the sternum with a small cushion, and blood pressure measurements were made from the right and left arms. Blood pressure measurement for one patient took about 30 minutes.

Statistical significance was set at $p < .05$. The data were evaluated using percentage, standard deviation and a One-way Anova test to determine the differences between

measurements. Tukey HSD test was used to determine the group (or the measured position) associated with the difference between measure. The approval of the ethics board of the hospital was obtained. The principles of the rights of privacy and confidentially and information act were observed throughout the study.

RESULTS

About 162 hypertensive patients were included in the study Patients' mean age was 65.27±13.5 years (range: 20-93), mean body mass indices (BMI) were 29.8 ±6.6 kg/m^2 in women and 26.9 ±4.3 kg/m^2 in men, and total BMI was 28.4 ±5.4kg/m^2 .Of the patients, 56.8% were women, 74.1% were married, and 46.9% were primary school graduates. Of them, 48.1% were housewives, 13% had smoking and 13.6% alcohol habits. Familial history of hypertension was noted in 63.6%, and 65.8% had mid-level economic status and 99.4% had social security coverage (Table 1).

From the measurements in the right arm, diastolic blood pressure (DBP) was 72.8 mmHg in the supine position, 73.1 mmHg in the supine position with the feet crossed at the ankles, 75.7 mmHg in the sitting position and 77.1 mmHg while speaking, yielding a significant difference (p=.003). A post hoc test was perform to determine the origin of this difference, and demonstrated that the difference was between the diastolic blood pressures measured in the right arm in the supine position and while speaking. Speaking increased diastolic blood pressure when the measurement was taken in the right arm.

Table 1: Demographic Variables of Study Population (n=162)

VARIABLES		n	%
Gender	Female	92	56.8
	Male	70	43.2
Age (mean±SD)		65.27±13.5	
BMI(mean±SD)	Female	29.8±6.6	
	Male	26.9±4.3	
	Total	28.4 ±5.4	
Marital status	Married	120	74.1
	Single	41	25.3
Education level	Illiterate	33	20.4
	Primary school graduate	76	46.9
	Secondary school graduate	36	22.2
	Collage	17	10.5
Profession	Housewife	78	48.1
	Self -employed	40	24.7
	Retired	32	19.8
	Civil servant	12	7.4
Smoking	Smoker	21	13.0
	Non-smoker	101	62.3
	Quit -smoker	40	24.7
Alcohol	Yes	22	13.6
	No	140	86.4
Presence of HT in the family	Yes	103	63.6
	No	59	36.4
Economic condition	Upper level	35	21.6
	Mid-level	113	65.8
	Lower level	14	8.6

In the diastolic blood pressure measurement in the left arm, readings were 72.7 mmHg in the supine position, 73 mmHg in the supine position with the feet crossed at the ankles, 75.2 mmHg while talking and 76.1 mmHg in the sitting position, with a significant difference among positions (p=.021). The difference was found to be between the sitting position and supine position, with diastolic blood pressure being higher in the sitting position. For the blood pressure measurement in the sitting position, left arm DBP was 01 mmHg higher than the DBP in the right arm (Table 2).

Table 2 : Effect of Different Positions on Blood Pressure in Study Population (n=162)

Positions							
Blood Pressure Measurement Methods	Sitting Position (1)	Supine Position (2)	In supine position with the feet crossed at the ankles (3)	While speaking (4)	F @	p-value	Post Hoc Tests
Right Arm SBP *	133.9±23	133.9±23	135±22	135.5±22	.212	.888	
Left Arm SBP	132.4±23	130.6±21	132.4±22	132.4±22	.272	.846	
Right Arm DBP **	75.7±12	72.8±12	73±12	77.1±13	4.670	.003	2 vs 4 / 4 vs 2
Left Arm DBP	76±12***	72.7±11	73±11	75.2±11	3.278	.021	1 vs 2 / 2 vs 1

* Systolic Blood Pressure **Diastolic Blood Pressure mm of Hg @ One way Anova test

DISCUSSION

In this study, body mass index (BMI) was measured as 29.8±6.6 kg/m^2 in women, 26.9±4.3 kg/m^2 in men, with a total BMI of 28.35±5.4 kg/m^2, demonstrating that all patients were overweight. BMI of the women in this study were just below the obesity threshold. Increased body mass index is an important risk factor for cardiovascular diseases and hypertension. About 01 unit increase in BMI leads to a 12% increase in the risk of developing hypertension.[5] The reason that Turkish women have higher BPs than men is their higher body mass indices. Among adults aged above 40 years, Turkish women have 2 kg/m^2 higher body mass indices and 10-11/4 mmHg higher BPs, on average, compared with men. Our study supports the study above.[6]

When the sitting position and other positions (while speaking, in the supine position, in the supine position with the feet crossed at the ankles) are compared, no difference in SBP was observed between the measurements in the right and left arms. However, in the measurement in the right arm, diastolic blood pressure was 72.8 mmHg in the supine position, 73.1 mmHg in the spine position with the feet crossed at the ankles, 75.7 mmHg in the sitting position, and 77.1 mmHg while speaking (p=.003) (Table 2). It was found that BP was higher when BP was measured in the right arm while the patient speaking. In a study by Lynch et al. in 30 hypertensive and 50 normotensive subjects investigating the effect of speech on BP, 16 patients had higher than 150 mmHg SBP readings and ⩾95 mmHg DBP readings during speech. Blood pressure decreased from 200/120 mmHg to 174/88 mmHg beginning from the first minutes of silence after cessation of speech. In the same study, authors also observed that BP increased rapidly while speaking, dropped again rapidly when speech was interrupted, and that speaking increased BP to a greater extent in subjects with high BPs.[7] Hellman and Grimm's studied the effect of intermittent and continuous speaking (reading magazines, books etc.) on BP in 48 patients with DBP ⩾ 90 mmHg, and determined that both intermittent and continuous speaking increased DBP significantly.[8] Another study examining the physical and emotional impact of speech and "white coat" effect on HT in 64 patients, Le Pailleur et al observed that speech increased SBP and DBP to a greater extent compared with the anticipated increase caused by the white coat factor.[9] Consistent with the study by Hellman and Grimm, our study found an increase only in DBP. In addition, higher DBPs measured during speech compared with DBPs measured in different body positions indicate a greater effect of speaking than body positions on BP. This result is critical in the process of making important decisions including diagnosing, determining the cardiac risk group and in initiating or modifying antihypertensive therapy.

No difference was noted in the SBP measured in the right arm. However, for the DBP measurement in the left arm, differences were seen between the readings taken in the supine position, supine position with the feet crossed at the ankles, while speaking and in the sitting position (p=.021). This difference was found to be between the sitting position and supine position, with DBP being higher in the sitting position (Table 2). In a similar study by Jamieson et al., BP

measured in the supine position was 2-3 mmHg higher for SBP and 2-3 mmHg lower for DBP compared with the BPs measured in the sitting position.[10] In the study by Sancaktar et al., no differences were observed between SBPs taken in supine and sitting positions, but SBP and DBP were higher than those measured in the standing position. This indicated that DBP was more susceptible to position than SBP. This study demonstrated that body position affected BP and argued that BP measurements in the sitting position would be reliable in the clinical setting[11]. Lu LC et al suggested that measurements in the supine position yielded higher blood pressure readings.[12] Our study, systolic and diastolic blood pressure in the right arm was not affected in the sitting position, whereas left arm diastolic blood pressure was higher. The position and arm used for measurement should be documented when measuring blood pressure.

DBP was lower in the supine position in measurements taken from the right and left arms (Table 2). Van der Steen MS et al., determined that SBP and DBP values were higher in the supine position than in the sitting position.[13] In a study by Eşer et al. in healthy students, BP was measured in the sitting, standing, supine positions and in the supine position with the feet crossed at ankles, and SBP and DBP readings were lower in measurements in the standing position and higher in the supine position.[14] In the study by Son JT and Lee E, DBP 75 minutes after a meal was the lowest in the supine position compared with other positions (e.g. sitting).[15] Lower DBP in the supine position was consistent with the study by Lee and in disagreement with the study by Steen et.al.

In our study, supine position with the feet crossed at the ankles did not affect BP ($p>.05$) (Table 2). Eşer et al. have also demonstrated that supine position with the feet crossed at the ankles did not affect BP readings.[14] Studies by Adiyaman et al. compared BP measurements taken with the legs crossed at the knees and the feet crossed at the ankles and feet placed on the floor, and found that crossing the feet at the ankles had no effect on BP.[16] In their study with two groups of patients, 49 hypertensive, 54 normotensive, Keele and Daniel observed that SBP increased to 5.9 mmHg and DBP to 3.0 mmHg on average when the legs were crossed.[17] The authors reported higher BP readings when the legs were crossed at the knees (legs crossed). Crossing the feet at the ankles had no effect on BP. In our study, supine position with the feet crossed at the ankles had no effect on BP, consistent with the study by Eşer and Adiyaman.

CONCLUSION

DBP was higher while speaking when BP was measured in the right arm, where as DBP was higher in the sitting position when BP was measured in the left arm. We therefore suggest documenting the position and arm used for BP measurement.

REFERENCES

1. Battegay EJ, Lip GYH, Bakris GL. (Eds), Hypertansion Principles and Practice. 1st Edition, Translated by: Kozan O, Editor. Istanbul: Avrupa Tip Kitapcilik; 2009:209 -407.
2. European Society of Cardiology (ESC) and European Society of Hypertension (ESH) Guideline 2007. Archives of the Turkish Society of Cardiology. 2007; 3: 3-9.
3. Turkish Society of Cardiology National Hypertension Treatment and Follow-up Guideline. Archives of the Turkish Society of Cardiology 2000; 28: 335-97.
4. 2013 ESH/ESC Guidelines for the management of arterial hypertension. Archives of the Turkish Society of Cardiology. 2014; 42(4): 1-72.
5. Huang Z, Willett WC, Manson JE et al. Body weight, weight change, and risk for hypertension in women. Ann Intern Med.1998;128 (2):81-8.
6. Onat A. Blood Pressure and Hypertension in our Society. In: TEKHARF 2017 Leading the Approach of Medical World to Chronic Diseases. Logos Publishing Tic. A.S., Istanbul, 2017;104-17.
7. Lynch J, Long JM, Thomas S et al. The effects of talking on the blood pressure of Hypertensive and Normotensive Individuals. Psychosomatic Med. 1981; 43:25-33.
8. Hellman R, Grimm SA. The influence of talking on diastolic blood pressure readings. Res Nurs Health. 1984; 7:253 -56.
9. Le Pailleur C, Montgermort P, Feder JM et al. Talking effect and "white coat" effect in hypertensive patients: physical effort or emotional content?. Behav Med. 2001;26: 149-57.
10. Jamieson MJ, Webster J, Philips SJ et al. The Measurement of Blood Pressure: sitting or supine, once or twice? J Hypertension. 1990; 8:635-40.
11. Sancaktar O, Aksoyek S, Kazazoglu R et al. Comparison of Office Blood Pressures in Supine, Sitting and Standing Positions with Ambulatory Blood Pressures. Archives of the Turkish Society of Cardiology,1992; 20:321-25.
12. Lu LC, Wei LS, Zeng CL et al. Differences in Blood Pressure Readings Between Supine and Sitting Positions in Hypertensive Patients. Cardiology.2008; 63:707-11.
13. Van der Steen MS, Pleijers AM, Lenders JW et al. Ifluence of different supine body positions on blood pressure: consequences for night blood pressure\dipper-status. J Hypertension. 2000; 21: 1983-92.
14. Eşer I, Khorshid L, Yapucu GU et al. The effect of different body positions on blood pressure. J Clin Nurs. 2007; 16:137-40.

15. Son JT, Lee E. Comparison of postprandial blood pressure reduction in the elderly by different position. Geriatric Nursing 34 (2013)282-288.

16. Adiyaman A, Verhoeff R, Lenders JWM et al. The position of the arm during blood pressure measurement in sitting position. Blood Press Monit. 2006;11: 309-13.

17. Keele SR, Price DC. Effects of crossed leg on blood pressure measurement. Clin Nurs Res. 2001; 10:202-13.