

Does Talking and Different Body (Sitting, Supine, Standing) Positions affect Blood Pressure?

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Abstract

This study aims to compare Blood Pressure (BP) values obtained sitting, talking, supine, and standing positions. The study was planned in a comparative and descriptive design and conducted on 357 hypertensive patients in the cardiology department at a private health center in Istanbul in 2016. The data were collected with a patient identification form and BP Measurements form. BP measurement was done with an aneroid sphygmomanometer. Measurements were done on the patients left and right arms, respectively, sitting, talking, supine and standing position. The blood pressure measurement process lasted about 30 minutes in each patient. The obtained data were analyzed with percentages, repeated measures (in order to determine from which measurement the difference originated) ANOVA and Bonferroni tests. The mean of the sitting position BP, talking and standing SBP was significantly lower than average ($p < 0.05$). There was no significant difference between talking and standing SBP averages ($p > 0.05$). Standing DBP, mean, talking, sitting and supine measured diastolic blood pressure was significantly higher than average ($p < 0.05$). Talking and sitting diastolic BP measured was no significant difference between the averages ($p > 0.05$). At the end of the study, we concluded that sitting is the most reliable position for the measurement of BP.

Keywords: Blood pressure measurement, sitting, talking, supine standing position,

1. Introduction

Blood pressure (BP) is measured with two basic techniques; direct and indirect (manual and digital) methods (Pickering et al., 2005). In clinics, indirect, manual BP measurement method is usually preferred for the evaluation of the pressure exerted by the blood on the vessel walls within the systemic arterial circulation (Verberk, Kessels, & Thien, 2011). The measurements are carried out either with mercury or aneroid sphygmomanometers (De Greeff et al., 2010). The most common device used in daily routine by nurses is the aneroid sphygmomanometer (O'Brien et al., 2003; Pickering et al., 2008). According to the Turkish Cardiology Association Guideline, these devices should be calibrated with the mercury sphygmomanometer every 6 months (Parati et al., 2008). BP, which is a vital sign, is a hemodynamic event and can be affected by various factors (Pickering et al., 2005). Therefore, the nurses, who are monitoring the blood pressure of the patients, should take the emotional state (Gabbay et al., 2006), fatigue, eating and smoking habits, fullness of the bladder and room temperature into consideration (Chobanian et al., 2003). The BP results are also affected by the type and brand of the device used, the measurer, preferred extremity for the measurement, with of the cuff and the patient's position (Cicolini et al., 2011; Myers, 2006; O'Brien et al., 2003). But the position of the patient during the BP measurement is often neglected (Netea, Lenders, Smits, Thien, 2003).

World Health Organization (WHO) and the International Society of Hypertension emphasize that regarding the routine BP measurements, the patient should be in a relaxed position. The extremity, which will be used for the measurement, should be placed and supported at the level of the heart. In addition, the Turkish Cardiology Association Work Group state that the patient should not talk during the measurement.

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The National Hypertension Treatment and Follow-Up Guideline of Turkish Society of Cardiology state that the environmental factors of the patients (fed state, fatigue, room temperature, and body position) should be checked by the measurer to ensure correct BP measurements. According to the Guideline of the European Society of Cardiology/European Society of Hypertension (ESC/ESH) of 2013, systolic blood pressures (SBP) higher than 140 mmHg and diastolic blood pressures (DBP) higher than 90 mmHg are accepted as hypertension. These levels are considered as limit values for the age and risk groups in adults (Verdecchia & Angeli, 2003). The objective of this study was to determine the differences between the blood pressures in certain conditions (sitting, talking, supine, standing position) in hypertensive patients older than 30 years.

2. Methods

The study was planned in a comparative and descriptive design and conducted on 357 hypertensive patients in the cardiology department at a private health center in Istanbul in December 2015/ February 2016. The participating patients were selected with a simple randomized sampling. Hypertensive patients, who were older than 30 years, had no psychological disorder, had adequate communication skills, were not pregnant and accepted to participate, were included in the study. All blood pressure measurements were performed with an aneroid sphygmomanometer (Omron) and stethoscope. The obtained data were recorded in the *Patient Description Form* and *Blood Pressure Entry Form*. The blood pressure measurements were done while the patient was sitting, talking, supine, standing position. The data were collected according to the below-mentioned steps: Clinical blood pressure measurement: The measurements were performed according to the nursing care guideline of the Turkish Society of Cardiology. The patients were let to rest for 5 minutes before the measurement. Special caution was exercised to assure that the cuff wrapped 80% of the arm and 2/3 of the arm length. The cuff was inflated 20 mmHg higher than the systolic blood pressure while the radial pulse was kept under control. Then the cuff was deflated with a rate of 2 mmHg per second. The appearance and disappearance of the Korotkoff sounds were considered for the determination of the systolic and diastolic blood pressures.

Materials: Aneroid sphygmomanometer (Omron) with a cuff width of 15x33cm. Stethoscope.

- Referring the patient to a quiet, comfortable room

1st measurement (in the sitting position)

- In the sitting position (on a chair with back support), while the patient reclined and his/her feet standing parallel on the floor.
- Fulfilling the *Patient Description Form*
- BP measurement, right arm
- BP measurement left arm
- Registration of the measurements in the *Blood Pressure Entry Form*
- 3 minutes resting

2nd measurement (talking)

- Certain questions were asked in order to provoke the patient to talk, while the previous sitting position was preserved.
- BP measurement, right arm
- BP measurement, left arm
- Registration of the measurements in the *Blood Pressure Entry Form*
- 3 minutes resting

3rd measurement (in the supine position)

- The patient rests in the supine position
- The right arm was supported with a small pillow at the midline level of the sternum
- BP measurement, right arm
- The left arm was supported with a small pillow at the midline level of the sternum
- BP measurement, left arm
- Registration of the measurements in the *Blood Pressure Entry Form*
- 3 minutes resting

4th measurement (in the standing position)

- The patient in the standing position
- BP measurement, right arm
- BP measurement, left arm
- Registration of the measurements in the *Blood Pressure Entry Form*
- 3 minutes resting

The blood pressure measurement process lasted about 30 minutes in each patient. The obtained data were analyzed with percentages, repeated measures (in order to determine from which measurement the difference originated) ANOVA and Bonferroni tests.

Research Question: Is there any difference between the results of the systolic and diastolic blood pressure measurements in the sitting, speaking, supine and standing positions?

2.1. Ethical Consideration

The study was approved by the Ethics Committee of Acibadem University (ATADEK-2015/7) and the institutional permission of the Atakent Hospital Coordinatorship of Acibadem Mehmet Ali Aydinlar University was also obtained. All patients were informed about the objective of the study by the researcher and the patients were included in the study after the informed patient consent was obtained from the patients, who accepted to participate. During the study, the privacy of the patients was taken into consideration and the ethical principles were respected.

3. Results

The study population included 357 patients. The mean of the participants was 52 ± 9 years; males were 52.9%. The majority of the patients were using antihypertensive agents (93.3%).

Table 1. Characteristics of Patients

Characteristics	n	%	
Gender			
Women	168		47,1
Men	189		52,9
Smoking			
Yes	147	(Mean 15.8)	41,2
No	210		58,8
Alcohol use			
No	301		84,3
Yes	56	(Mean 3.11)	15,7
Drug Use			
Yes	333		93,3
No	24		6,7
Co-morbid Diseases			
Yes	197		55,2
No	160		44,8
Family history of Hypertension			
Yes	308		86,3
No	49		13,7
Age	Mean	Min	Max
	52.8	30	80
Total	357		100,0

Participants of the families 86.3% of had a history of hypertension and they (55.2 %) had more than one chronic disease. Measured blood pressure (BP) averages were evaluated as systolic blood pressure (SBP) and diastolic blood pressure (DBP). The average SBPs were sitting $143,2 \pm 13,9$; talking $144,4 \pm 13,4$; supine position $139,2 \pm 13,5$; standing position $145,0 \pm 14,1$; mmHg and DBP average of the measurements were $85,8 \pm 8,9$; $85,9 \pm 9,2$ $82,5 \pm 8,6$; $87,0 \pm 9,0$ mmHg respectively (Table1).

The evaluation of the four differences SBP measurements revealed a statistically significant difference between the sitting, talking, supine, standing position ($p < 0.05$). The SBP level during the talking was significantly different from the standing SBP ($p < 0.05$). We observed that the sitting SBP (1st measurement) was a little bit lower than the other (2nd, 3rd, and 4th) measurements. The evaluation of the measurements showed that there was a significant difference between the groups ($p < 0.05$). However, the difference between the average of the SBP during the talking and the average of the standing SBP was not statistically significant ($p > 0.05$) (Table 2).

Table 2. Comparison of systolic blood pressure results measured during speech and different body positions

Multiple Comparisons (Post-hoc)						
		Mean (I-J)	SS	p. a *	Interval Confidence Average 95 %	
					Min.	Max.
Talking	Sitting	1,221*	0,353	0,004	0,286	2,157
	Supine	5,213*	0,343	0,000	4,302	6,124
	Standing	-0,627	0,357	0,479	-1,575	0,320
Sitting	Talking	-1,221*	0,353	0,004	-2,157	-0,286
	Supine	3,992*	0,341	0,000	3,086	4,897
	Standing	-1,849*	0,365	0,000	-2,817	-0,880
Supine	Talking	-5,213*	0,343	0,000	-6,124	-4,302
	Sitting	-3,992*	0,341	0,000	-4,897	-3,086
	Standing	-5,840*	0,332	0,000	-6,720	-4,960
Standing	Talking	0,627	0,357	0,479	-0,320	1,575
	Sitting	1,849*	0,365	0,000	0,880	2,817
	Supine	5,840*	0,332	0,000	4,960	6,720

* Mean differences are significant at 0.05 level.

*a. Multiple comparisons correction method: Bonferroni

The mean DBP when supine, talking, sitting and standing position measured diastolic blood pressure were significantly lower than the average ($p < 0.05$). Standing diastolic arterial pressure, mean, talking, sitting and supine position measured DBP was significantly higher than average ($p < 0.05$). Talking and sitting DBP measured was no significant difference between the averages ($p > 0.05$) (Figure 1). However, the average of the standing DBP was significantly higher than the sitting, talking and supine position DBP respectively ($p < 0.05$).

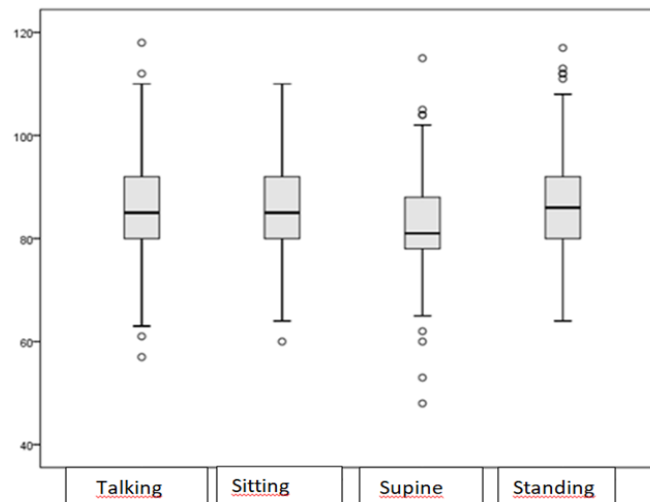


Figure 1. Diastolic Blood Pressure measurement ranges

4. Discussion

Hypertension can be diagnosed with a correct and precise measurement of blood pressure (Calhoun et al., 2008). Incorrect and ambiguous BP measurements with non-invasive methods may lead to medical complications and economic losses. The non-invasive BP measurement methods preferred in the monitoring of the hypertensive patients should be used by experienced nurses (O'Brien et al., 2003). Although the advantages of the control of the blood pressure in hypertensive patients are well known, the level of the hypertension management in all health centers including the primary care health centers is still unsatisfactory. The main objective of the BP control is to keep the systolic and diastolic blood pressures below 140 mmHg and 90 mmHg respectively (Rushton & Smith, 2016). According to the findings of this study, the diastolic BP measurements were more affected by the patient's body positions than the systolic BP measurements. Ersoy, Pinar conducted also a similar study in 2011 and found out that systolic and diastolic BP levels reached the highest values in the supine position and although the systolic BP measurements differed, there was no significant difference between the diastolic BP measurements. Lynch (1981) investigated the BP during the speaking and they reported that speaking increased the BP. Green reported that blood pressure changed prominently during the speaking. The results of our study are consistent with this study (Aksöyek et al., 1992). Regarding the results of our study, we concluded that the measurement of the BP in the supine position delivered lower values and the standing systolic and diastolic BP levels were higher than the BP levels in other body positions.

5. Conclusion

Nurses should ensure that the patients rest at least 5 minutes before the measurement and try to eliminate all factors, which may influence the measurement results. The BP measurement should be performed according to the Nursing Care Guideline of the Turkish Society of Cardiology and it should be kept in mind that measurements in the supine position will lead to relatively lower results. The sitting position should be preferred and measurements in the standing position and during conversation should be avoided.

- As different body positions lead to different measurements, the measurements should be performed always in the same position in the hypertensive patients.
- As the measurements can deliver different results in sitting, lying, standing positions and during the speaking, the BP measurements should be performed in different body positions in patients with the suspicion of orthostatic hypertension and the patients should not talk during the measurements.
- Which body position and extremity are used for the measurement should be also recorded.

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Authorship Statement

We confirm that all listed authors meet the authorship criteria, and all authors are in agreement with the content of the manuscript. ZY and BU designed the present study. ZY collected, analysed, and interpreted the data. BU wrote the first draft of the manuscript. ZY and BU revised the manuscript. All authors read and approved the final manuscript to be published.

Conflict of interest

The authors declare no conflict of interest.

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