

THE EFFECT OF SAD TEXT ON BLOOD PRESSURE

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Contribution

SO conceived, designed and did statistical analysis & manuscript writing. BB and AG did data collection and manuscript writing. GC did review and final approval of manuscript

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ABSTRACT

Objective: To determine experimentally whether reading sad text increases blood pressure of individuals or not.

Methodology: This cross sectional study was performed at Health Care Center Turkey. Adults who had referred to public health center were included in this study between 1st December 2014 to 28th February 2015. Data of blood pressure measurements and questionnaire were recorded. At first, subjects were taken into a quiet room and had rest for five minutes in sitting position. Before reading sad text and blood pressure was measured on the right arm. Then a sad text of 900 words was read by the volunteer and as soon as it was finished, blood pressure was measured again. Data were analyzed with percentage, frequency, variance analysis, student's t-tests.

Results: About 45 adults were included in the study . Mean age of individuals was 43.4 ± 13.8 years and 55.6% of them were females and 35.6% had hypertension. Average systolic blood pressure of first measurement was 123.91 ± 5.58 mm Hg, average diastolic blood pressure was 75.44 ± 5.07 mm Hg. There was no difference when diastolic blood pressure values were compared before and after sad text reading for the subjects ($p = .64$). There was significantly difference when systolic blood pressure values were compared before and after sad text reading for the subjects ($p = .00$).

Conclusion: After reading a sad text, systolic blood pressure of individuals increased.

Key Words: Hypertension, Blood Pressure, Sad Text

INTRODUCTION

Hypertension is a serious health problem bringing about many chronic diseases such as stroke, coronary artery disease, heart failure, chronic kidney disease, blindness and target organ damage.¹ According to the World Health Organization, it was stated that the region with the highest prevalence of hypertension is Africa with a rate of 46% and the region with the lowest prevalence is America with a rate of 35%.² According to the Turkish Hypertension Prevalence (Patent 2: Prevalence, Awareness and Treatment of Hypertension in Turkey 2) the prevalence of hypertension was found to be 30.3%, awareness rate was 54.7% and treatment receiving status of individuals with hypertension was 47.5%. Again in the same study, it was determined that hypertension control rate was 28.7% and hypertension control rate in patients receiving anti-hypertensive treatment was 20%.³ According to the National Disease Burden study, it was determined that hypertensive heart diseases constitute 3% of all mortality causes and it is in the 6th place among diseases causing death in Turkey.⁴

In the etiology of hypertension, unchangeable factors such as genetics, age, gender and changeable factors such as diet, smoking, excessive alcohol use, anxiety, chronic stress, anger, sadness play a role.⁵ In the studies, it was identified that especially in those patients prone to hypertension, the sympathetic nervous system is affected in response to stress, and hypertension develops as a result of vasoconstriction and other autonomic responses occurring in the veins. It is believed that as a result of emotional stress, the pressure on vasomotor center decreases and stimuli output increases, and a change in endothelium occurs in carotid sinus, aortic arch and vasomotor centers accordingly. As a result of increased sympathetic activity, systematic vascular resistance increases with neurohormonal stimulus, and endothelium cells of the veins with increased resistance secrete more vasoconstrictor substances. Chronic overstimulation of the sympathetic nervous system leads to contraction and narrowing of arterial lumen hence vasoconstriction. As a result of vasoconstriction, hypertension develops.⁶ Although physiopathologic processes of emotional status with regard to development of hypertension vary, this is the commonly accepted assumption.⁷

In the review conducted by Ruthledge and Hogan between 1972-2000 to evaluate relationship between essential hypertension and psychological stress, the results of 15 studies were evaluated and it was found that the risk of developing hypertension was eight times higher in individuals with high psychological stress.⁸ In the systematic review which Pan et al. conducted to determine relationship between anxiety and hypertension, a total of 21 studies were examined and it was observed that there was a direct relationship between anxiety and hypertension.⁹ In another study which Mushtaq and Najam conducted on 237

people (137 individuals with hypertension), on the other hand, a positive relationship was found between hypertension and such variables as depression, anxiety and stress.¹⁰

In order to accurately treat hypertension, it is primarily needed to make a diagnosis. Blood pressure measurement is essential to make a diagnosis and to assess effectiveness of treatment after diagnosis. Accurate measurement of blood pressure is under the responsibility of nurses.¹¹ Therefore, nurses must be careful to ensure appropriate equipment and environmental conditions, and use accurate techniques during measuring blood pressure.

Points to pay attention to ensure appropriate environmental conditions are that the patient did not take cigarettes, tea, coffee or caffeinated beverages 30 minutes before the measurement, that the room temperature is normal and that he / she is rested for five minutes before the measurement. Important points to note when measuring with the right technique are that the patient is seated in the upright position, with the back resting on the back, the arm to be measured is naked, the sleeve is wrapped around the heart level and the patient's arm is supported.¹ Another important point that the nurse should pay attention to in order to ensure proper environmental conditions is that the patient should be careful not to be sad during the blood pressure measurement.

It is known that sadness leads to stress and stress prevents accurate measurement of blood pressure. Therefore, nurses should always take into consideration psychological state of patients during measuring their blood pressure.

The research was conducted as a descriptive and analytic study to determine the effect of stress after reading sad texts on blood pressure in individuals

METHODOLOGY

The research was performed in a cross-sectional design between 1st December 2014 and 28th February 2015. It recruited adult individuals aged 18 and over who accepted to participate in the research on a voluntary basis. They were able to read and speak Turkish and had no communication or mental problems.

The family health center where the research was conducted is a health institution that is located in Istanbul in Turkey, providing primary health care. This study was conducted with verbal permission and written informed consent from each family physician and from the individuals participating in the study. Written consent was obtained from the family health centre.

Data were collected using a questionnaire developed by researchers by performing a literature review. The questionnaire consisted of two parts, as a form in which questions regarding socio-demographic characteristics and values obtained from blood pressure measurements were

included.

The sad text that participant individuals were made to read was written by the researchers and consisted of 900 words. It narrated a real life story in the sad text. This story is a letter telling a woman with end-stage renal failure who wrote in her own words and on a rather dramatic note to all the family members. The duration of reading the text varied depending on reading speed of each individual and it took 20 minutes on average.

The research was performed in an empty room in the family health center. It was made sure that the room where the research was carried out was quiet and ergonomic. Individuals participating in the research were left alone for five minutes in the room quietly in upright sitting position to take a rest and all kinds of environmental factors that might affect their blood pressure were avoided (sound, light and temperatures were maintained within normal range). When the resting period of the participants ended, their blood pressures were measured and recorded. Then, participants read the sad text. They were left alone in the room while reading the text. Immediately after the end of the text reading phase, the blood pressure values of the individuals were measured and recorded again. Individual blood pressures were measured by following the same criteria for both measurements. Prior to blood pressure measurements, optimum environmental conditions were provided and individuals were assured that they did not have caffeine, cigarettes, and adrenergic stimulants in the last 30-60 minutes before the measurement. It was made sure both feet were kept on the ground in parallel in sitting position.

Blood pressures of the participants were measured using a digital sphygmomanometer with standard (12-13 cm long and 35 cm wide) and upper sleeve 80% catching sleeve. It was noted that the sleeve was 2-3 cm above the antecubital space. Measurements were made from the right arms of individuals supported at the heart level.

Mean, standard deviation, number, percentage and frequency values were used in evaluation of qualitative and quantitative characteristics. Paired sample t test was used in the comparison of the first measurement and the second measurement averages obtained from blood pressure measurements of the participants, and two way ANOVA was used in comparison of these measurements in the first and the second measurements according to demographic characteristics. Statistical significance was taken as $p < 0.05$.

Written consent was obtained from the family health center where the study was conducted. The research was conducted with individuals voluntarily participated in the research and they were informed of the purpose of the research, their verbal and written informed consent was obtained. The Helsinki Declaration of Human Rights was adhered to as it was required to protect individual rights

throughout the research process.

RESULTS

About 45 volunteer adults were included in the study. The average age of the individuals who participated in the study was 43.4 ± 13.8 years and 55.6% of them were women, 53.3% was normal weight, 82.2% were married, 53.3% were graduated from high school, 86.6% lived with their parents, 51.1% had medium level economic condition, 31.1% were smokers, 17.8% were alcoholics, 95.6% took social support from their parents, 68.9% had general optimistic mood, 64.4% of the participants didn't have hypertension and 75.6% of their parents had hypertension (Table 1).

In the first measurement, the average SBP of the participants after five minute resting period in sitting position was 123.91 ± 5.58 mm Hg, the average DBP was 75.44 ± 5.07 mm Hg, and in the second measurement after having read the sad text, the average SBP was 126.08 ± 7.06 mm Hg, the average DBP was 75.62 ± 5.63 mm Hg. In these two measurements, there was a difference between the systolic blood pressures ($p < .001$), while there was no difference between the diastolic blood pressures ($p = .64$) (Table 2).

When systolic and diastolic blood pressures before and after having read the sad text were compared, no significant difference was found in terms of gender, marital status, smoking status and general temperament. While systolic blood pressure increased in those above and equal to 40 years old ($p = .014$), no difference was observed in diastolic blood pressure. It was found that systolic and diastolic blood pressure tended to increase as body mass index increased. It was determined that those with hypertension had increased systolic and diastolic blood pressure. While systolic blood pressure increased in those individuals who perceived their health status poorly, did not have social support from their family and had hypertension in their family, no significant difference was found in diastolic blood pressures (Table 3).

Table 1: Socio-Demographic Characteristics of the Participants (n= 45)

Variables	n	%
Age		
<39	21	46.7
>40	24	53.3
Mean (43.4±13.81)		
Gender		
Female	25	55.6
Male	20	44.4
Body Mass Index (kg/m²)		
18 -24	24	53.3
25 -30	15	33.4
>31	6	13.3
Marital status		
Married	37	82.2
Single	8	17.8
Education Status		
Literate -Primary	7	15.5
Junior-High School	14	31.1
Graduate	24	53.3
Persons living together		
Parents	39	86.6
Friends	3	6.7
Alone	3	6.7
Economic conditions		
Upper level	10	22.2
Mid level	23	51.1
Lower level	12	26.7
Smoking status		
Yes	14	31.1
No	31	68.9
Alcohol drinking status		
Yes	8	17.8
No	37	82.2
Taking social support		
Yes	43	95.6
No	2	4.4
General temperament		
Optimistic	31	68.9
Pessimistic	14	31.1
Presence of hypertension		
Yes	16	35.6
No	29	64.4
Health status		
Good	29	64.4
Medium	10	22.3
Bad	6	13.3
Hypertension in the family		
Yes	34	75.6
No	11	24.4
Total	45	100

Table 2: Comparison of Systolic and Diastolic Blood Pressures before and After Having Read the Sad text

Blood Pressure	First Measurement X±SD	Second Measurement X±SD	T	p
SBP	123.91±5.58	126.08±7.06	t= -4.12	.00
DBP	75.44±5.07	75.62±5.63	t= -0.46	.64

Table 3: Comparison of Systolic and Diastolic Blood Pressures Before and After Having Read the Sad Text in terms of Demographic Characteristics

Variables	First Measurement *SBP	Second Measurement *SBP	F	p-value	Post Hoc	First Measurement **DBP	Second Measurement **DBP	F	p	Post Hoc
Gender										
Female	124.95±6.40	126.35±6.79	.73	.39		76.30±4.16	75.55±4.43	0.38	.536	
Male	123.08±4.80	125.88±7.40				74.76±5.68	75.68±6.53			
Age										
39	122.38±5.86	123.04±6.28	6.37	.014		74.38±4.95	74.19±5.21	0.10	.75	
40	125.25±5.07	128.75±6.73				76.37±5.09	76.87±5.80			
Marital status										
Married	124.32±5.82	126.78±7.30	3.16	.078		75.02±5.11	75.32±5.68	1.89	.17	
Single	122.00±4.07	122.87±4.99				77.37±4.71	77.00±5.58			
Body Mass Index (kg/m²)										
18-24(1)	122.08±4.95	123.54±5.97	9.22	.00	1vs3	73.79±5.02	73.75±5.51	6.10	.03	1vs3
25-30(2)	125.53±5.98	127.06±7.44				76.20±4.58	76.06±5.04			
31 (3)	127.167±4.95	133.83±3.71				80.16±3.18	82.00±4.69			
Presence of Hypertension										
Yes	125.31±4.64	130.68±6.28	12.17	.001		77.25±5.87	78.68±6.10	6.92	.01	
No	123.13±5.97	123.55±6.20				74.44±4.37	73.93±4.65			
Smoking Status										
Smoking	124.28±7.80	126.14±8.61	0.55	0.45		75.00±5.1	74.50±6.71	2.39	.12	
No smoking	123.74±4.38	126.06±6.40				75.64±5.10	76.12±5.12			
Health Status										
Good (1)	123.34±6.07	123.96±6.49	3.95	.023	1vs2	74.82±4.40	74.24±4.73	3.07	.051	
Medium (2)	125.40±5.58	130.40±7.86				76.40±6.76	77.70±6.73			
Bad (3)	124.16±2.31	129.16±4.16				76.83±5.41	78.83±6.36			
General Temperament										
Optimistic	123.85±6.60	125.92±7.80	0.18	.66		76.00±5.08	76.07±5.91	0.06	.80	
Pessimistic	123.93±5.17	126.16±6.84				75.19±5.13	75.41±5.59			
Taking Social Support										
Yes	123.62±5.53	125.83±6.98	26.45	.00		75.39±5.16	75.60±5.73	0.07	.78	
No	130.00±2.82	131.50±				76.50±3.53	76.00±4.24			
Hypertension in the family										
Yes	124.94±5.38	127.85±6.83	4.78	.033		76.11±5.18	76.67±5.57	2.19	.14	
No	120.72±5.15	120.63±4.73				73.36±4.29	72.36±4.67			

Two way ANOVA, *SPB: Systolic Blood Pressure, **DBP: Diastolic Blood Pressure

DISCUSSION

It was found that while systolic blood pressure of the participants increased after reading the sad text ($p < .00$), diastolic blood pressure did not change ($p > .05$) (Table 2). Hildingh and Baigi found in the study they conducted with

12,166 people that the group with hypertension had higher anxiety.¹² In the study by Zhang et al., heart rate and blood pressure of 64 college students with normal blood pressured increased due to exam anxiety.¹³ According to a study conducted on young software specialists in India, those with higher job stress was found to have higher blood pressure.¹⁴

In the studies of Moy et al. and McCubbin et al., it was found that stress increased risk of hypertension.^{15, 16} About 455 healthy individuals were included in the study conducted by Ginty et al., and these people were re-evaluated 5 years later, it was found that those individuals who were diagnosed with hypertension had higher anxiety and depression symptoms.¹⁷ In the study Footman et al. conducted in nine countries, a significant relationship was found between hypertension and psychosocial stress.¹⁸ In the study of Brian Byrd and Brook, stress, anxiety, depression and life style was pointed out as important barriers on uncontrollable hypertension.¹⁹ In many other studies, it was found that individuals with anxiety and stress had higher blood pressure.^{9, 10, 20, 21} The above studies show similarity with our study. This situation can be explained that type and duration of stress, anxiety and depression, their being acute or chronic, person's perception of stress and coping with stress may change blood pressure.^{22, 23}

In our study, it was found that people over age 40 had higher systolic blood pressure ($p = .014$) (Table 3). According to the data of the Turkish Hypertension Prevalence study, the hypertension prevalence is 11.8% between 18-29 years of age; it is 21% between 30-39 years of age; 38.9% between 40-49 years of age; 56.4% between 50-59 years of age; 70.1% between 60- 69 years of age.²⁴ Cohen et al. found incidence of hypertension higher in the elderly.²⁵ In the United States of America, the hypertension prevalence is 7.3% between 18-39 years of age; 32.4% between 40-59 years of age; and 65% over 60.²⁶ In the above studies, it is observed that blood pressure increases with age. Our study shows similarity with the above studies.

In our study, blood pressure of obese people was found to be higher ($p < .001$) (Table 3). In Turkey hypertension and treatment guidelines, it was stated that there is a relationship between body mass index which equals to or above 27 and high blood pressure, and every 1 kg weight loss causes 1.6 mmHg and 1.3 mmHg decrease in systolic and diastolic blood pressure.²⁷ In the study conducted by Zhang and Wang in China on 38.822 children and adolescent, it was observed that obesity was a risk factor for blood pressure.²⁸ In the study conducted by Díaz et al., it was found that 34.9% of the population of the United States of America had obesity and 29.1% had hypertension. It was found that hypertension increased with obesity.²⁶ Our study is similar to the literature.

CONCLUSION

After reading sad text, systolic blood pressure of individuals increased. Stress, anxiety and emotional situation that a person goes through leads to changes in blood pressure.

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