



Hypertensive Patients and Normotensive Individuals: Differences in Anger Inventory

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ABSTRACT

Background: Hypertension (HTN) is a common condition with increasing prevalence rate. Hypertensive patients have a high prevalence of mental disorders, including anger.

Objectives: The present study aimed to investigate the score of anger in hypertensive patients in comparison to the individuals with normal blood pressure in Shiraz.

Patients and Methods: This case-control study was conducted on 100 patients with HTN and 107 normal controls with the mean age of 52.48 and 53.78 years, respectively. These patients had referred to Shiraz HTN clinic in 2013. All the patients completed the Multidimensional Anger Inventory (MAI) and the results were analyzed using the SPSS statistical software, 2010.

Results: The participants were matched regarding age and other demographic factors which might have influenced HTN. Distributions of these factors were partly similar and the differences were not significant. The HTN group obtained higher scores in all dimensions. Besides, the differences were significant in all subscales, except for anger.

Conclusions: In line with the previous researches, the present study indicated that high level of aggression was correlated to high blood pressure. Therefore, it is necessary to have psychological interventions along with other interventions for hypertensive patients. Overall, this research confirmed biopsych approach to psychosomatic diseases.

► Implication for health policy/practice/research/medical education:

This research article deals with the concept that life skills and the way an individual approaches them have a significant impact on one's health. Therefore, it is strongly recommended that health is related to psych.

1. Background

Hypertension (HTN) is the most common cardiovascular disease, which is defined as having a systolic blood pressure equal to or greater than 140 mmHg and a diastolic blood pressure equal to or greater than 90 mmHg. In the individuals older than 20 years in Iran, the prevalence of HTN was 25.31% in males and 26.05% in females. This rate is still increasing in Iran and, consequently, HTN is considered as a major health problem (1-3). Both genetic and environmental factors play a role in HTN, but primary

(or essential) HTN (idiopathic HTN) is the most common form of HTN (counting for 95% of the cases) and the cause is not known yet (4).

Environmental risk factors for HTN include obesity, overweight, drinking too much alcohol, smoking, sedentary lifestyle, high dietary salt intake, lack of calcium and potassium, hyperlipidemia, glucose intolerance, and social and mental stress (3). It has long been hypothesized that psychosocial factors and mental disorders, including anxiety, depression, mood disorders, and substance abuse, are presented more commonly in patients with HTN and Cardiovascular Disease (CVD). They also play a role in development of CVD (4, 5). High blood pressure and its symptoms can be influenced by psychological factors,

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such as stress, different personality types, and anger (6). It has been documented that high trait anger is related to problematic cardiovascular outcomes (7). These factors can exacerbate the disease through having an effect on different body systems, including cardiovascular system and autonomic nervous system (6). Furthermore, it remains uncertain whether such psychosocial effects are causal and through which pathophysiological mechanisms they might be mediated (8).

Anger is a mental and physical excitement that is manifested as personality conflict and mental arousal (9). This excitement exists in all aspects of life and is considered as a common basis for many mental and physical disorders. Anger can be commonly seen in personality disorders, psychosomatic disorders, mood disorders, conduct disorder, schizophrenia, and cognitive disorders that usually coexist with self-confirmation and others' blaming (6, 10). Genetic and environmental factors, such as air pollution, noise, and crowding, can cause anger, as well. Overall, nervousness can be triggered by either external or internal factors. Situations, like getting stuck in traffic and being exposed to other individuals' inappropriate behaviors, are external triggers. On the other hand, thoughts, memories, and anger arousing situations are considered as internal triggers. External expression of anger can be detected in facial expressions, body language, physiological responses, and at times, acting aggressively (11).

A study performed on Canadian adults with a positive family history of HTN in 2010 showed that anger was a modifiable risk factor for HTN (12). Similarly, Ewart et al. reported in their study that regardless of race, anger increased the risk of CVD and HTN (13). Another study conducted in Iran in 2012 compared patients with high blood pressure and individuals with normal blood pressure. The results of that study indicated that anger trait level was higher in hypertensive patients, but anger-out was the same in both groups (14). Xue et al. suggested that anger led to imbalance in endothelium-produced vasodilating and vasoconstricting substances, leading to an increase in blood pressure (15). Another study conducted in 2013 showed that stress, anger, and depression were among of the predisposing factors to CVD (16). Yet, some researches, such as the one by Babaei Beigi et al., proved that educational programs might be helpful in self-management of HTN in case the related psychological factors are recognized (17).

2. Objectives

Taken together, since the prevalence of HTN is increasing, the present study aims to compare the score of anger in patients with HTN and individuals with normal blood pressure.

3. Patients and Methods

This case-control study was conducted on 100 hypertensive patients (blood pressure equal to or greater than 140/90 mg) between 25 and 65 years of age who fulfilled the inclusion criteria of the study. These criteria included having no history of psychiatric illness under treatment by a psychiatrist or psychologist, having no history of drug abuse, and being interested in participating in the research.

The participants were randomly selected from the patients referred to Imam Reza clinic affiliated to Shiraz University of Medical Sciences (SUMS) during February to November 2013. The control group also consisted of 107 individuals with normal blood pressure within the age range of 21 - 70 years who were usually among the patients' companions. The present study was approved by the Ethics Committee of SUMS and all the participants signed written informed consents. They were also ensured about the confidentiality of their information.

3.1. Data Collection Instruments

The study data were collected via two different questionnaires:

1- A demographic sheet designed by the researchers, which evaluated demographic characteristics, such as age, sex, marital status, and occupation, and 2- Multidimensional Anger Inventory (MAI), which is a valid and reliable scale in Iran. Khodayarifard et al. stated that the reliability of different dimensions of MAI varied from 0.79 to 0.94. This questionnaire evaluates anger in five dimensions, including anger arousal, range of anger-eliciting situation, hostile outlook, anger-in, and anger-out, via 30 questions responded through a five-option Likert scale. According to its scoring system, higher scores indicate higher anger levels (18).

3.2. Data Analysis

The collected data were analyzed using the Statistical Package for Social Sciences (SPSS Inc., Illinois, USA), version 16. Data analysis was performed using descriptive statistics (mean \pm SD), mean comparison test, and chi-square test. It should be mentioned that normal distribution of the data was confirmed by one sample Kolmogorov-Smirnov test. P value $<$ 0.05 was considered as statistically significant.

4. Results

This study was conducted on 100 patients with HTN and 107 normal controls with the mean age of 52.48 and 53.78 years, respectively. The results revealed no significant difference between the two groups regarding the demographic factors, such as sex, marital status, and education level. The results have been presented in Table 1.

Thus, the participants were matched regarding age and other demographic factors, which might have influenced HTN. Distribution of these factors was also partly similar and the differences were not statistically significant. Then, differences in anger were evaluated. In all dimensions, the HTN group obtained higher mean scores. Besides, the differences were statistically significant in all the dimensions, except for anger-out. The results have been presented in Table 2.

5. Discussion

Anger can be defined as an aggressive response to the feeling of being threatened or getting ready to fight. Expression of anger can be found in facial expressions and physiological responses, such as increased heart rate and increased levels of adrenaline and noradrenaline. Expression of nervousness depends on biological and cultural factors

Table 1. Frequency of the Demographic Factors in HTN and Control Groups

		HTN	Normal	P value
		Frequency (%)	Frequency (%)	
Gender	Male	33 (33.3%)	43 (42.2%)	0.19
	Female	66(66.7%)	59 (57.8%)	
Marital Statuses	With spouse	80 (84.2%)	94 (89.5%)	0.26
	Without spouse	15 (15.8%)	11(10.5%)	
Education	Elementary school	32 (35.2%)	24 (23.1%)	0.29
	Guidance school	13 (14.3%)	18 (17.3%)	
	High school	28 (30.8)	35 (33.7)	
	College education	18 (19.8%)	27 (26%)	

Table 2. Comparison of the Mean Differences between HTN and Control Groups

	Group	Mean (SD)	P value	95% Confidence Interval of the Differences	
				Lower	Upper
Anger	HTN	107.13(22.5)	0.001	5.59	16.31
	Normal	96.17(16.27)			
Anger arousal	HTN	34.67(11.01)	0.001	1.84	7.06
	Normal	30.21(7.84)			
Range of anger-eliciting situation	HTN	28.24(10.2)	0.013	0.64	5.31
	Normal	25.26(6.4)			
Hostile outlook	HTN	36.03(8.37)	0.001	2.44	6.59
	Normal	31.51(6.72)			
Anger-in	HTN	20.39(4.6)	0.001	0.29	1.22
	Normal	15.82(4.4)			
Anger-out	HTN	11.56(2.9)	0.22	3.31	5.82
	Normal	11.09(2.5)			

and is manifested differently in different communities (19). The present study, which was done in Iranian culture, showed that different dimensions of aggression were higher in HTN patients compared to the normal control group. This finding revealed that the patients suffered from aggression significantly. However, these results cannot confirm that anger causes HTN due to the case-control design of the study. This study can only suggest existence of a relationship between these two factors.

The present study results were in line with those of the previous studies, all of which confirming that aggression is co-morbid with HTN. A study conducted on adult Canadians with positive family history of HTN in 2010 also showed that aggression was a modifiable risk factor for HTN (12). In 2011, Ewart et al. demonstrated that the risk of CVD and HTN was higher in aggressive individuals (13).

Similarly, Hossieni et al. conducted a study in Iran in 2012 and compared 200 hypertensive patients to the same number of individuals with normal blood pressure. The two groups were matched with respect to age, sex, and education level. The results of that study indicated that nervousness trait was more frequent in hypertensive patients than in those with normal blood pressure. However, the results revealed no significant difference between the two groups concerning anger-out (14).

Another study suggested that nervousness led to an imbalance in endothelium- produced vasodilating and vasoconstricting substances, causing an increase in blood pressure. It was also determined that stress, anger, and depression were among the predisposing factors to CVD (16).

A study in 2006 compared aggression level between

the two genders and indicated no statistically significant differences between the two (20). One other study revealed a statistically significant relationship between nervousness and systolic blood pressure in males, but not in females (21).

The results of that study also showed no statistically significant differences among different age groups. However, some other researchers reported lower frequency of anger in older individuals in comparison to younger ones, which might be attributed to environmental situations and their experience (22).

Symonides et al. disclosed that negative emotions had adverse effects on blood pressure. The researchers recommended that treating negative emotions might treat uncontrolled blood pressure (23). In line with the present research, May et al. reported that forgiveness had a significant effect on cardiovascular risk (7). Overall, it can be concluded that life skills and the way a person approaches them have a significant impact on one's health. Therefore, it is strongly recommended that health is related to psych. It should be mentioned that although HTN is associated with some factors, such as diabetes mellitus, hyper lipidemia, and body mass index, these factors were out of the scope of this study. Hence, we did not take them into account.

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Authors' Contribution

Study concept and design: Ali Sahraian, Alireza Moaref, Vala Rezaee; Collection of the data: Mahsa Mokhtari; Analysis and interpretation of the data: Arash Mani, Mahsa Mokhtari, Ebrahim Moghimi; Drafting the manuscript: all authors; Critical revision of the manuscript for important intellectual content: Arash Mani, Ali Sahraian, Alireza Moaref; Statistical analysis: Arash Mani. All the authors confirm the proof page of the article.

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References

1. Azizi F, Ghanbarian A, Madjid M, Rahmani M. Distribution of blood pressure and prevalence of hypertension in Tehran adult population: Tehran Lipid and Glucose Study (TLGS), 1999-2000. *Journal of human hypertension*. 2002;**16**(5):305-12.
2. Samavat T, Hojatzade A, Naderi Asiabar Z. [Guidance of diagnosis, assessment and treatment of hypertension]. 1st ed. Tehran: Sadra; 2001.
3. Delavari A, Hori N, Alikhani S, Mahdavi A, Hoseini S, Haghighi S, et al. [Prevalence, treatment and control of hypertension and prehypertension in Iranian people]. *Journal of Medical Council of Islamic Republic*. 1385;**24**(4):372-80.
4. Mohaghegh A, Bakhtiarian A, Mohebitabar S, Forghani Z, Ghazi-Khansari M, Hossieni M, et al. Blood mercury concentration: hypertensive versus normotensive adults. *Tehran University Medical Journal*. 2008;**66**(2):131-5.
5. Lowe B, Grafe K, Ufer C, Kroenke K, Grunig E, Herzog W, et al. Anxiety and depression in patients with pulmonary hypertension. *Psychosom Med*. 2004;**66**(6):831-6.
6. Rusting CL, Nolen-Hoeksema S. Regulating responses to anger: effects of rumination and distraction on angry mood. *J Pers Soc Psychol*. 1998;**74**(3):790-803.
7. May RW, Sanchez-Gonzalez MA, Hawkins KA, Batchelor WB, Fincham FD. Effect of anger and trait forgiveness on cardiovascular risk in young adult females. *Am J Cardiol*. 2014;**114**(1):47-52.
8. Ohira T. Psychological distress and cardiovascular disease: the Circulatory Risk in Communities Study (CIRCS). *J Epidemiol*. 2010;**20**(3):185-91.
9. Parvaz R, Delavar A, Dortaj F. [Construction and standardization of multidimensional anger inventory Gilangharb city high school students in the academic year 87-86]. *Andazegiri tarbiati*. 1390;**2**(5):41-66.
10. Taylor JL, Novaco RW. *Anger treatment for people with developmental disabilities: A theory, evidence and manual based approach*. John Wiley & Sons; 2005.
11. Deffenbacher JL. Cognitive-behavioral conceptualization and treatment of anger. *Journal of Clinical Psychology*. 1999.
12. Shehata MF. A proposed study on how far anger contributes to initiating essential hypertension in Canadian Caucasian adults with a family history of hypertension. *Clin Med Insights Cardiol*. 2010;**4**:9-13.
13. Ewart CK, Elder GJ, Smyth JM, Sliwinski MJ, Jorgensen RS. Do agonistic motives matter more than anger? Three studies of cardiovascular risk in adolescents. *Health Psychol*. 2011;**30**(5):510-24.
14. Hosseini SH, Mokhberi V, Mohammadpour RA, Mehrabianfar M, Lashak NB. Anger expression and suppression among patients with essential hypertension. *Int J Psychiatry Clin Pract*. 2011;**15**(3):214-8.
15. Xue YT, Mei XF, Su WG, Li YL, Meng XQ, Zhang J. Effect of anger on endothelial-derived vasoactive factors in spontaneously hypertensive rats. *Heart Lung Circ*. 2013;**22**(4):291-6.
16. Steptoe A, Kivimaki M. Stress and cardiovascular disease: an update on current knowledge. *Annu Rev Public Health*. 2013;**34**:337-54.
17. Babaei Beigi MA, Zibaenezhad MJ, Aghasadeghi K, Jokar A, Shekarforoush S, Khazraei H. The effect of educational programs on hypertension management. *Int Cardiovasc Res J*. 2014;**8**(3):94-8.
18. Khodayarifard M, Gholamali LM, AKBARI ZS, Liaghat S. PSYCHOMETRIC PROPERTIES OF SPIELBERGER'S STATE-TRAIT ANGER EXPRESSION INVENTORY-2 AMONG OF IRANIAN STUDENTS. 2010.
19. Sadock BJ. *Kaplan & Sadock's comprehensive textbook of psychiatry*. lippincott Williams & wilkins Philadelphia, PA; 2000.
20. Kopper BA, Epperson DL. Sex and Sex-Role Comparisons in the Expression of Anger. *Psychology of women Quarterly*. 1991;**15**(1):7-14.
21. Shapiro D, Goldstein IB, Jamner LD. Effects of cynical hostility, anger out, anxiety, and defensiveness on ambulatory blood pressure in black and white college students. *Psychosom Med*. 1996;**58**(4):354-64.
22. Schieman S. Age and anger. *J Health Soc Behav*. 1999;**40**(3):273-89.
23. Symonides B, Holas P, Schram M, Sleszycka J, Bogaczewicz A, Gaciong Z. Does the control of negative emotions influence blood pressure control and its variability? *Blood Press*. 2014;**23**(6):323-9.