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ORIGINAL RESEARCH

How do the Psychosocial Factors Affect Blood Pressure in Patients with Hypertension? A Cross-Sectional Study

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Abstract

Background: Hypertension leads to complications such as myocardial infarction, stroke, and renal failure if not treated appropriately. Blood pressure is influenced by biopsychosocial factors such as physical, environmental, emotional, cognitive and behavioral.

The aim of this study is to find the relationship between blood pressure levels of patients with hypertension and sociodemographic characteristics, traumatic life events and depression status.

Method: Our sample was 305 hypertensives visiting a family physician in Rize, a city in the Black Sea (Northern part) Region of Turkey. The study was completed between December 2017 to April 2018. Participants completed a sociodemographic questionnaire including questions for sociodemographic characteristics, lifestyle behaviors, psychiatric complaints traumatic life events, and blood pressure control. Depression status was assessed using The Hospital Anxiety and Depression Scale (HAD). Data as analyzed using the SPSS 21 statistical analysis program.

Results: Of the participants, 54.0% (n = 165) had psychiatric complaints, 52.5% (n = 160) had traumatic life events, and 37.7% (n = 115) stated that they had controlled blood pressure. Blood pressure levels were significantly related with psychiatric complaints, life events, HAD-Anxiety (HAD-A) and HAD-Depression (HAD-D) scores (p = 0.001, p = 0.000, p = 0.001, p = 0.002, respectively). There was reverse relationship between blood pressure levels and monthly household income (p = 0.03).

Conclusion: It is harder to have controlled blood pressure for hypertensives in the presence of traumatic life events, psychiatric complaints, higher HAD-A and HAD-D scores, compared to hypertensives with none of these. Psychosocial factors should be questioned in hypertensives when especially blood pressure cannot control.

Keywords

Hypertension, Psychiatric complaints, The Hospital Anxiety and Depression Scale, Traumatic life events

Introduction

Hypertension is the most common condition seen in primary care and leads to myocardial infarction, stroke, renal failure, and death if not detected early and treated appropriately [1]. Traumatic life events, sociodemographic characteristics, anxiety and depression disorders should be considered on hypertension management. In a study about effects of optimism, pessimism, and trait anxiety (measured by mood scales) on ambulatory blood pressure, pessimistic and anxious adults had higher blood pressure levels and felt more negative and less positive than did optimists or low anxious adults [2]. In another study, it has been found that happiness, anger, and anxiety (measured emotional state as happy, angry or anxious by scales from one (low) to ten (high) scores) increase blood pressure to differing degrees and emotional effects may be greater with more labile blood pressure [3]. The presence of a mental health disorder with hypertension is associated with higher cardiovascular disease mortality than hypertension alone [4]. Although earlier detection of hypertension has been demonstrated in patients with anxiety and depression, the relationship of mental health disorders to hypertension control is unknown. It is yet unknown how the diagnosis of either anxiety or depression affects time to incident hypertension con-



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trol [4]. Patients with depression and/or anxiety represent a particularly vulnerable population as they are at higher risk for developing hypertension [5,6]. Byrd, et al. [7] found that hypertension diagnosis rates were higher in patients with depression and anxiety than in patients without mental condition.

Our aim in this study was to find the relationship between hypertension and sociodemographic characteristics, psychiatric complaints, traumatic life events, and The Hospital Anxiety and Depression Scale (HAD) scores.

Methods

Research design and setting

Our sample was 305 hypertensives visiting a family practice in Rize, a Northern city in the Black Sea Region of Turkey. Only hypertensive patients receiving medicines for blood pressure control included in the study and patients with other chronic conditions (such as diabetes mellitus, hypothyroidism, hypercholesterolemia, heart disease, chronic heart failure, history of heart or cerebral attacks etc.) were excluded. Research was completed between December 2017 to April 2018. Formal permission was obtained from Directorate of Health in Rize. All participants gave informed verbal consent. Participants completed the main questionnaire and The Hospital Anxiety and Depression Scale. We designed the main questionnaire including 18 items. These items are about age, gender, marital status, educational status, socio-

economic status, monthly household income, number of households, households (alone, wife/husband, wife/husband and children etc.), place of living, relationship with family members, relationship with friends, alcohol consumption, smoking, exercise, diet, psychiatric complaints, traumatic life events, blood pressure situations. The questionnaire and HAD scale were completed face-to-face and conducted by the authors.

The hospital anxiety and depression scale

The Scale was designed by Zigmond and Snaith in 1983 to measure anxiety and depression in a general medical population of patients [8]. The questionnaire comprises seven questions for anxiety and seven questions for depression, a total of 14 items. The score range is between 0 to 21; 0-7 "normal", 8-10 "mild", 11-14 "moderate", and 15-21 "severe" emotional disorder. Turkish validity and reliability of The Hospital Anxiety and Depression Scale was made by Aydemir, et al. in 1997 [9].

Data analysis

Data was analyzed using the SPSS 21 statistical analysis program. Demographic data, psychiatric complaints, life events, blood pressure levels were analyzed as numbers and percentages. HAD scale numerical scores were analyzed as mean and standard deviation. Also HAD-A and HAD-D scores classified by cut-off points and mentioned in results as 'HAD-A/HAD-D classified

Table 1: Sociodemographic characteristics and lifestyle behaviors of participants (n = 305).

Characteristics	n (%)	
Mean age \pm SD	54.6 \pm 11.9	
Gender	Female	85 (27.9)
	Male	220 (72.1)
Married/living together	245 (78.7)	
Mean number of households \pm SD	2.6 \pm 1.2	
Households	Wife/husband and children	110 (36.1)
	Wife/husband	90 (29.5)
	Alone	60 (19.7)
Place of living	District	200 (65.6)
	Village	95 (31.1)
Relationship with family members	Very good	130 (42.6)
	Good	140 (45.9)
Relationship with friends	Very good	133 (43.6)
	Good	157 (51.5)
Socioeconomic status	Moderate	200 (65.6)
	Moderate-high	80 (26.2)
Educational status	University graduate	50 (16.4)
	High school graduate	50 (16.4)
	Primary or secondary school graduate	170 (55.7)
Number of cigarettes smoked a day	< 10	75 (24.6)
	10-20	55 (18.0)
	Quit smoking	55 (18.0)
Alcohol consumption	Rarely*	50 (16.4)
	Never	220 (72.1)
Regular exercise**	10 (3.3)	
Healthy diet	185 (60.7)	

*Once a month; **more than 150 minutes per week.

scores'. Pearson chi-square test, Skewness-Kurtosis values, Shapiro-Wilk and Kolmogorov-Smirnov tests were used. Pearson Correlation and Spearman's rho tests were used for correlation. T-test, Mann-Whitney U and One-Way ANOVA tests were used for analysis of independent samples. The level of significance was set as $p < 0.05$.

Results

Sociodemographic characteristics and lifestyle behaviors of participants are shown in Table 1. Of the participants, only 3.3% ($n = 10$) were doing regular exercise more than 150 minutes per week, with 60.7% ($n = 185$) having healthy nutritional habits (Table 1). The mean number of household individuals was 2.6 ± 1.2 persons (Table 1).

Psychiatric complaints of participants are shown in Table 2. Of the participants, 46.0% ($n = 140$) had no complaints, 32.8% ($n = 100$) described their psychiatric complaints as anxiety (Table 2).

Traumatic life events of participants are shown in Table 3. Of the participants, 47.5% ($n = 145$) had no traumatic life events, 32.8% ($n = 100$) described their traumatic life events as 'accident, sickness, disability or death of any individual/s in their families' and 13.1% ($n = 40$) indicated domestic conflict (Table 3).

Blood pressure control in participants is shown in Table 4. About one-third of patients had controlled blood pressure (Table 4).

There was a significant relationship between gender and psychiatric complaints ($p = 0.016$) and female participants having more psychiatric complaints than males. There was a significant relationship between

gender and traumatic life events ($p = 0.021$). The rate of controlled blood pressure was significantly higher in males ($p = 0.013$). HAD-A classified scores (Cut-off values are indicated in Table 5) were significantly related to gender ($p = 0.003$) and HAD-A scores were higher in female participants (Table 5).

Blood pressure levels was related to monthly household income ($p = 0.03$) (Table 5). Patients with higher

Table 4: Blood pressure control in participants.

Blood pressure control	n (%)
Have controlled blood pressure	115 (37.7)
Regular medication but admission to emergency department sometimes due to high blood pressure	100 (32.8)
Regular medication but blood pressure is sometimes high	65 (21.3)
Regular medication but blood pressure is always high	15 (4.9)
Irregular medication but controlled blood pressure	5 (1.6)
Regular medication but blood pressure is sometimes low (hypotension)	5 (1.6)
Total	305 (100)

Table 5: Psychiatric complaints, HAD-A and HAD-D classified scores, life events, blood pressure and related sociodemographic factors.

Variables		p*	
Gender	Psychiatric complaints	0.016	
	HAD-A**	0.003	
	HAD-D**	0.195	
	Traumatic life events	0.021	
	Blood pressure	0.013	
	Smoking	0.003	
	Alcohol consumption	0.984	
	Regular exercise	0.461	
	Healthy diet	0.443	
Educational status	Blood pressure	0.208	
	Socioeconomic status	Blood pressure	0.283
	Monthly household income	Blood pressure	0.030
Marital status	Blood pressure	0.305	
	Psychiatric complaints	0.542	
	HAD-A**	0.319	
Households	HAD-D**	0.311	
	Blood pressure	0.336	
	Place of living	Blood pressure	0.865
Relationship with family members	Blood pressure	0.076	
	Relationship with friends	Blood pressure	0.089
	Psychiatric complaints	Blood pressure	0.001
HAD-A**		0.000	
HAD-D**		0.000	
Traumatic life events	Traumatic life events	0.030	
	Blood pressure	0.000	
	HAD-A**	Blood pressure	0.001
HAD-D**	Traumatic life events	0.015	
	Blood pressure	0.002	
	Traumatic life events	0.232	

*Pearson chi-square test; **Classified as; HAD-A: below cut-off (0-10 points), above cut-off (11-21 points); HAD-D: below cut-off (0-7 points), above cut-off (8-21 points).

Table 2: Psychiatric complaints of participants.

Complaints	n (%)
None	140 (46.0)
Anxiety	100 (32.8)
Feeling tense	15 (4.9)
Panic	13 (4.2)
Depression	10 (3.3)
Anhedonia	10 (3.3)
Apprehension	5 (1.6)
Sense of worthlessness	5 (1.6)
Dementia	5 (1.6)
Sense of cheerless	2 (0.7)
Total	305 (100)

Table 3: Traumatic life events of participants.

Life events	n (%)
None	145 (47.5)
Accident, sickness, disability or death of any individual/s in the family	100 (32.8)
Domestic conflict	40 (13.1)
Divorce	10 (3.3)
Alcoholic individual/s in the family	5 (1.6)
Separation from family	5 (1.6)
Total	305 (100)

income had better control of blood pressure.

Blood pressure was related with psychiatric complaints, traumatic life events, HAD-A and HAD-D classified scores ($p = 0.001$, $p = 0.000$, $p = 0.001$, $p = 0.002$, respectively). Participants with psychiatric complaints and traumatic life events stated that they had difficulties on blood pressure control and sometimes their blood pressure levels rise. As HAD-A and HAD-D scores were over cut-off values, success on blood pressure control was less (Table 5).

There was a significant relationship between psychiatric complaints and HAD-A and HAD-D classified scores ($p = 0.0001$, $p = 0.0001$, respectively) (Table 5).

Psychiatric complaints were related to traumatic life events directly ($p = 0.030$) (Table 5).

As the number of households increased, HAD-D scores significantly decreased ($p = 0.019$, correlation coefficient = -0.299) (Table 6). However, there was no correlation with HAD-A scores ($p > 0.05$). Females had

Table 6: HAD-A and HAD-D scores, blood pressure and related sociodemographic factors.

Variables		n	HAD-A Mean \pm SD p	HAD-D Mean \pm SD p	Blood pressure p
Age (mean \pm SD) (years)		54.6 \pm 11.9	9.23 \pm 5.23 0.602 [*]	6.74 \pm 3.95 0.413 [*]	0.518 ^{***}
Number of households (mean \pm SD)		2.62 \pm 1.26	9.23 \pm 5.23 0.419 ^{**}	6.74 \pm 3.95 0.019^{**}	0.795 [*]
Gender	Male	85	5.82 \pm 3.44	5.24 \pm 4.11	0.013^{**}
	Female	220	10.55 \pm 4.55 0.001^{***}	7.32 \pm 3.70 0.065 ^{***}	
Blood pressure	Regulated	115	6.22 \pm 4.24	4.74 \pm 3.13	
	Not regulated	190	11.05 \pm 4.66 0.0001^{***}	7.95 \pm 3.94 0.002^{***}	
Socioeconomic status	Low-moderate	25	9.40 \pm 3.28	5.20 \pm 2.86	0.283 [*]
	Moderate	200	9.30 \pm 5.39	6.88 \pm 3.98	
	Moderate-high	80	9.00 \pm 5.56 0.979 ^{***}	6.88 \pm 4.28 0.670 ^{***}	
Relationship with family members	Very good	130	7.62 \pm 5.15	5.46 \pm 3.46	0.076 ^{**}
	Good	140	10.71 \pm 5.22	7.71 \pm 4.16	
	Moderate	35	9.29 \pm 4.30 0.092 ^{***}	7.57 \pm 4.03 0.093 ^{***}	
Relationship with friends	Very good	133	6.96 \pm 4.53	5.70 \pm 3.56	0.089 [*]
	Good	157	10.90 \pm 5.30	7.42 \pm 4.13	
	Moderate	15	12.33 \pm 2.08 0.008^{***}	9.00 \pm 4.35 0.154 ^{***}	
Smoking	Never	120	10.71 \pm 5.09	6.71 \pm 3.48	0.083 [*]
	Quit smoking	55	7.27 \pm 6.32	5.27 \pm 4.42	
	Yes	130	8.69 \pm 4.66 0.156 ^{***}	7.38 \pm 4.12 0.338 ^{***}	
Alcohol consumption	1-5 times a month	85	9.50 \pm 5.39	8.56 \pm 4.59	0.935 ^{**}
	Never	220	9.07 \pm 5.26 0.774 ^{***}	6.14 \pm 3.51 0.098 ^{***}	
Healthy diet	Yes	185	9.54 \pm 5.00	7.22 \pm 3.91	0.570 [*]
	No	120	8.75 \pm 5.63 0.569 ^{***}	6.00 \pm 4.00 0.244 ^{***}	
Exercise	Yes	110	9.09 \pm 5.63	7.23 \pm 4.59	0.348 [*]
	No	195	9.31 \pm 5.06 0.878 ^{***}	6.46 \pm 3.58 0.473 ^{***}	
Traumatic life events	Yes	160	11.95 \pm 3.93	8.51 \pm 3.66	0.0001^{***}
	No	145	6.48 \pm 4.63 0.002^{***}	5.21 \pm 3.26 0.038^{***}	
Psychiatric complaints	Yes	165	12.58 \pm 3.11	8.45 \pm 3.53	0.001^{**}
	No	140	5.29 \pm 4.42 0.0001^{***}	4.71 \pm 3.48 0.0001^{***}	

^{*}Pearson Correlation; ^{**}Spearman's rho, ^{***}T-test; Mann-Whitney U, Pearson chi-square test, One-Way ANOVA^{***}.

higher HAD-A scores than males ($p = 0.001$). Participants with high HAD-A and HAD-D scores had significantly poor control of hypertension ($p = 0.000$, $p = 0.002$, respectively). HAD-A scores of participants who described their relationship with friends as 'very good' were significantly lower than those of the 'moderate' situation ($p = 0.008$; post hoc tests, tukey). HAD-A and HAD-D scores were significantly higher in participants having traumatic life event/s ($p = 0.002$, $p = 0.038$, respectively). Furthermore, HAD-A and HAD-D scores were significantly higher in participants with psychiatric complaints ($p = 0.000$, $p = 0.000$, respectively) (Table 6).

Discussion

This study suggested that psychosocial factors such as psychological complaints and traumatic life events impair blood pressure control in patients with hypertension. A study in South Africa suggested that self-reported diagnosis of hypertension is more common among those with anxiety disorders, depressive disorders and comorbid anxiety-depression compared to those without a mental disorder [10]. Our findings about having controlled blood pressure is harder in the presence of psychological factors and mental disorders such as anxiety and depression were consistent with those of the several studies [11-15]. Rutledge and Hogan reported an overall increased hypertension risk among anxious subjects although the hypertension risk did not reach significance. They also found an increased risk for hypertension for the depressed subjects [16]. On the contrary, in a large-scale cohort study, it was found that when compared with healthy controls, subjects with major depressive disorder had a significantly lower mean systolic blood pressure and were less likely to have isolated systolic hypertension. In the same study, anxious subjects had a significantly higher mean diastolic blood pressure (but not systolic blood pressure) compared with controls [17]. Despite of conflicting findings, it seems that emotional distress and traumatic life events may impair blood pressure control. We also found that psychological disorders, traumatic life events, and emotional state (anger, unhappiness, and sadness) seem to be the confounding factors for elevated blood pressure.

It has been reported that patients with hypertension on antidepressant medications have lower blood pressures compared to those not on these medications possibly due to decreased baroreflex sensitivity and altered neuro-endocrine pathways [17,18]. Fluoxetine and sertraline, but not paroxetine, cause a reduction in heart rate that was nearly parallel to the sympatho-inhibition. In the same research, fluoxetine and sertraline did not increase blood pressure [19,20].

There are studies explaining the negative effect of smoking on blood pressure control. Patients without a history of tobacco use had faster and better blood pressure control than current or former tobacco users. This finding is concerning because of the increased car-

diovascular risk associated with tobacco use [21,22]. However, we could not find a significant relationship between smoking and blood pressure.

It was interesting to find that almost one-third of the patients had admission to emergency department sometimes due to high blood pressure and complaints due to it (headache, palpitation, feeling bad etc.). A confounding factor such as a traumatic life event should be kept in mind [10]. A meta-analysis supported that depression was probably an independent risk factor for hypertension as a confounding factor [6]. Emotional state (happiness, anger, or anxiety) significantly contributed to the variation of blood pressure in this sample of borderline hypertensive patients. The comparison of the pressures during each reported emotional state show that anger and anxiety increase blood pressure more than happiness [3].

It has been previously established that patients with mental health disorders visit healthcare providers more frequently [23] and have a higher economic burden of healthcare utilization than those without mental health disorder [24]. This higher visit frequency likely results in more blood pressure measurements, supporting timely blood pressure follow-up [4].

In our study, male participants had more controlled blood pressure levels than females. It may be explained by significantly higher HAD-A scores in females, and thus by the negative effect of anxiety on blood pressure. Conversely, there are studies indicating that women have better control of blood pressure than men [4,25].

As a result, patients with traumatic life events, psychiatric complaints, higher HAD-A and HAD-D scores demonstrated poor control of blood pressure. Sociodemographic characteristics are correlated with blood pressure level. Female patients with higher HAD-A scores had poor blood pressure control. Participants with higher income had better blood pressure control. Traumatic life events, psychiatric complaints and emotional state (anger, unhappiness, sadness) seem to be the confounding factors causing admission to emergency department due to high blood pressure. In conclusion, sociodemographic factors should be considered on the management of hypertension and should be investigated in hypertensives if blood pressure is not controlled.

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Conflict of Interest

None.

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