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Evaluation of the Obesity and Depression in Hypertensive Patients

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ABSTRACT

Aim: Hypertension is one of the most common preventable causes of death in the world. In previous studies, the contribution of anxiety and depression symptoms in hypertension was investigated, but results were unclear. Obesity is one of the most important risk factors that leads to hypertension. In this study, we aimed to investigate the effect of body mass index (BMI) and Hamilton depression score on blood pressure in patients who comes to the Family Medicine Unit in Duzce University.

Material and Methods: In this sectional study, 228 people diagnosed with obesity were included who admitted Duzce University family medicine unit. The relationship between BMI and Hamilton depression scores with systolic and diastolic blood pressure were studied in patients.

Results: 200 of the patients (88%) enrolled in the study were women, and 28 of them (%12) were men. In our study, there was not significant effect of gender, occupational status, educational status and smoking on Hamilton depression score. Hamilton depression scores were analyzed in 228 patients, there was no depression in 182 patient (79.8%). Minor depression was detected in 35 patient (15.3%), major depresssion was found in 11 patients (4.8%). Increasing in The Hamilton depression score had a statistically significant effect on the increase in systolic blood pressure (p=0.017).

Conclusion: According to these results, increasing BMI and Hamilton depression score were found to be associated with blood pressure increase. Holistic approaches to hypertensive patients are very important. Patient's lifestyle, habits, current weight and psychological stress status should be examined in detail. This shows us that biopsychosocial holistic approach of family medicine unit to patient plays an important role in the prevention and treatment of hypertension.

Keywords: Hypertension; obesity; depression.

Hipertansiyon Hastalarında Obezite ve Depresyonun Değerlendirilmesi

ÖZ

Amaç: Hipertansiyon, dünyada önlenebilir ölüm nedenlerinin arasında en sık karşılaşılanların başında gelir. Anksiyete ve depresyon semptomlarının da hipertansiyon gelişimine önemli katkısı olduğu daha önce birçok çalışmada araştırılmıştır. Ancak, çalışmaların sonucunda farklılıklar gözlenmiştir. Hipertansiyona neden olan en önemli risk faktörlerinden birisi obezitedir. Biz bu çalışmamızda Düzce Üniversitesi Aile Hekimliği polikliniğine başvuran hastalarda, vücut kitle indeksi (VKİ) ve Hamilton depresyon skorunun kan basıncı üzerine olan etkisinin araştırılması amaçlandı.

Gereç ve Yöntemler: Bu kesitsel çalışmaya, Düzce Üniversitesi Aile Hekimliği polikliniğine başvuran ve obezite tanısı konan 228 hasta çalışmaya dahil edildi. Hastaların VKİ ve Hamilton depresyon skorları hesaplanarak, sistolik ve diastolik kan basınçları ile olan ilişkileri incelendi.

Bulgular: Çalışmaya dahil edilen hastaların 28'i erkek (%12), 200'ü kadın (%88) idi. Çalışmamızda cinsiyet, meslek durumu, öğrenim durumu ve sigara içiciliğinin HAMD depresyon puanı üzerine anlamlı etkisi olmadığı saptandı. Çalışmaya dahil edilen 228 hastanın Hamilton depresyon puanı incelendi. 182 (%79,8) hastada depresyon saptanmadı. 35 hastada (%15,3) minör depresyon saptandı. 11 hastada (%4,8) majör depresyon saptandı. Hamilton depresyon skoru artışının sistolik kan basıncında artışı üzerine istatistiksel olarak anlamlı etkisi olduğu saptandı (p=0,017).

Sonuç: Elde edilen bulgulara göre, VKİ ve Hamilton depresyon skoru artışının kan basıncı artışı ile ilişkili olabileceği saptandı. Hipertansiyon hastalarına bütünsel yaklaşımlar önemlidir. Hastaların yaşam tarzı, alışkanlıkları, mevcut kilo

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durumu ve psikolojik stres durumları ayrıntılı olarak incelenmelidir. Bu da bize gösteriyor ki, aile hekimliğinin hastalara biyopsikososyal olarak bütünsel yaklaşımı hipertansiyon korunması ve tedavisinde önemli bir rol oynamaktadır.
Anahtar Kelimeler: Hipertansiyon; obezite; depresyon.

INTRODUCTION

Hypertension is a systemic disease that causes morbidity and mortality due to cardiovascular and renal diseases. Gender and corrective factors such as high consumption of salt and alcohol, obesity, high-calorie diet, low physical activity, fatigue, and psychological stress play a role in the etiology of hypertension (1). Therefore, lifestyle modifications such as stopping smoking and drinking alcohol, increasing physical activity, limiting salt consumption and preventing obesity are of great importance as well as pharmacological treatment in the treatment of hypertension.

Increased body weight and obesity are associated with increased blood pressure. According to data from Framingham Heart Study, 70% of men with hypertension and more than 60% of women with hypertension are obese (2). Furthermore, there is a strong correlation between depression and hypertension. Rutledge et al. (3) investigated the relationship between hypertension and psychological stress and found that the risk of hypertension was eight times higher in individuals whose psychological stress levels were high. In another study, depression has been shown to be an independent risk factor for the development of hypertension (4).

The aim of this study was to investigate the Hamilton Depression Rating Scale (HAM-D) scores and blood pressure levels in patients with a body mass index (BMI) of >30 who applied to the outpatient clinic of Düzce University Department of Family Medicine.

MATERIAL AND METHODS

A total of 228 patients who were admitted to the outpatient clinic of Düzce University Department of Family Medicine between July 2014 and December 2014 and whose BMI was 30 kg/cm² or above according to the values determined by World Health Organization (WHO). Patients were contacted when they came for routine check-ups or when their first examination was completed, and patients who met the inclusion criteria were informed about the purpose and characteristics of the study. Patients with a BMI >30 kg/m², between the ages of 18-65, and volunteers were included in the study. Patients with endocrine diseases or chronic diseases which was not related to obesity and using medications that could cause obesity were not included in the study. All patients who were informed about the subject agreed to participate in the study. Anthropometric measurements consisting of height, weight, BMI, body fat percentage and visceral fat ratio were obtained. Clinical and demographic data of the patients were recorded. After 12 hours of fasting, blood samples were obtained from all patients included in the study via antecubital route between 08.00 and 10.00 am. Following the sample collection, laboratory parameters of the patients including fasting plasma glucose, lipid profiles, liver function tests (aspartate aminotransferase [AST], alanine aminotransferase [ALT]), renal function tests (urea and creatinine) and vitamin B12 values were measured. Hamilton Depression Rating Scale scores of the patients were calculated. The scales used in psychiatric evaluation and research were applied in a room suitable for psychiatric interviews. The person who applied the scales helped the patients in filling the scales. Blood pressures of the patients were measured via brachial route using a mercury sphygmomanometer (Riester ©) in a calm and quiet environment while they were in the sitting position after at least 20 minutes of rest. At least two measurements were made and the average of the measurements was recorded. Patients were prevented from behaviors that could affect blood pressure such as smoking, drinking tea, coffee or energy drink until 30 minutes before the measurement. The study protocol was approved by Düzce University Clinical Trials Ethics Committee (approval no.: 201449, approval date: 05.08.2014). Informed consent was obtained from all patients.

Statistical Analyses

Statistical analysis was performed using Statistical Package for Social Sciences (SPSS) version 11.5 software for Windows (SPSS Inc, Chicago, IL, United States). Descriptive statistics (mean, standard deviation) were used to evaluate the study data. The distribution of variables was measured with the Kolmogorov-Smirnov test. T test and Mann-Whitney U test were used in the analysis of quantitative independent data. Chi-square test was used in the analysis of qualitative independent data, and Fischer test was used when Chi-square test conditions were not met. Pearson correlation coefficient was used to evaluate the relationship between the parameters. Results were evaluated at a 95% confidence interval and expressed as mean ± standard deviation (SD). A p value of <0.05 was considered statistically significant.

RESULTS

A total of 228 patients, who were admitted to the outpatient clinic of Düzce University Department of Family Medicine and whose BMI was 30 or above, were included in the study. Of the patients included in the study, 28 were male (12%) and 200 were female (88%). There was no significant difference between male and female patients in terms of smoking, chronic disease history, number of anti-hypertensive drugs used, family history of hypertension, and HAM-D scores. The rate of having a profession was found to be significantly higher in male patients than in female patients ($p<0.0001$). Male patients were found to have a higher educational background than females ($p<0.0001$) (Table 1).

The assessment of HAM-D scores of 228 patients included in the study revealed that 182 (79.8%) patients had no depression. On the other hand, minor depression was found in 35 (15.3%) patients whereas 11 (4.8%) patients had major depression. No depression was found in 26 (92%) of 28 male patients. Minor depression was found in 2 (8%) and no major depression was found in the male patient group. Depression was not observed in 156 (78%) of 200 female patients whereas minor and major depression was observed in 33 (16%) and 11 (8%) patients, respectively.

Table 1. Demographic and clinical data

				GENDER		Total
		MAN	%	WOMAN	%	
Job	YES	28	49%	29	51%	57
	NO	0	0%	171	100%	171
P value		**<0.001**				
Education status	Primary school	7	5%	146	95%	153
	Middle school	4	3%	9		13
	High school	5	7%	25	83%	30
	Univercity	12	37%	20	73%	32
P value		**<0.0001**				
Number of anti-hypertensive drugs	0	23	12%	160	88%	183
	1	4	12%	29	88%	33
	2	1	9%	10	91%	11
	3	0	0%	1	100%	1
P value		0.968				
Family history of hypertension	YES	9	8%	92	92%	101
	NO	19	14%	108	86%	127
P value		0.118				
Cigarette	YES	8	15%	45	85%	53
	NO	13	9%	129	91%	142
	QUİT	7	21%	26	79%	33
P value		0.127				
Hamilton depression status	NO	26	%14	156	%86	182
	Minor	2	5%	33	95%	35
	Major	0	0%	11	100%	11
P value		0.164				

The effect of occupational status, educational status, smoking, chronic disease status, continuous medication use, number of anti-hypertensive medications used, and family history of hypertension on the Hamilton's depression score was questioned. In our study, it was observed that gender, occupational status, education level and smoking did not have a significant effect on Hamilton depression score. The score was found to be significantly higher in the group with chronic disease (p=0,05) and in the group with using continuous medication (p=0,024) (Table 2).

The increase in HAM-D score was found to cause a statistically significant increase in systolic blood pressure (SBP) (p=0.017) (Figure 1).

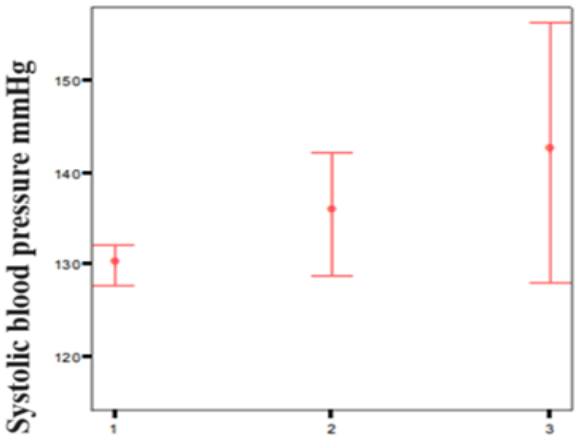

Figure 1. Relationship between systolic blood pressure and HAM-D score (Depression No:1 Minor:2 Major:3)

Table 2. Patient groups according to hamilton depression scores

		According to Hamilton depression score						Total
		No	**%**	**Minor**	**%**	**Major**	**%**	
Gender	**MAN**	26	92 %	2	8%	0	0%	28
	WOMAN	156	78 %	33	16%	11	6%	200
p value		0.164						
Job	**YES**	51	89 %	4	7%	2	4%	57
	NO	131	76 %	31	18%	9	6%	171
p value		0.150						
Education status	**Primary school**	114	74 %	30	19%	9	17 %	153
	Middle school	11	84 %	2	16%	0	0%	13
	High school	27	90 %	2	6%	1	4%	30
	Univercity	30	94 %	1	3%	1	3%	32
p value		0.15						
Cigarette	**YES**	37	70 %	11	20%	5	10 %	53
	NO	117	82 %	19	13%	6	5%	142
	quit	28	85 %	5	15%	0	0%	33
p value		0.179						
Chronic disease	**YES**	79	74 %	23	21%	5	5%	107
	NO	103	85 %	12	10%	6	5%	121
p value		**0.05**						
Number of drugs used continuously	**YES**	74	73 %	23	23%	5	4%	102
	NO	108	86 %	12	10%	6	4%	126
p value		**0.024**						
Number of anti-hypertensive drugs used	**0**	151	83 %	23	13%	9	4%	183
	1	22	67 %	9	27%	2	6%	33
	2	9	82 %	2	18%	0	0%	11
	3	0	0%	1	100%	0	0%	1
p value		0.086						
Hypertension story in family	**YES**	78	77 %	16	16%	7	7%	101
	NO	104	82 %	19	15%	4	3%	127
p value		0.397						
Total Score		182	80 %	35	15%	11	5%	228

Diastolic blood pressure (DBP) was not statistically significant different between the three groups determined according to the HAM-D scores (Figure 2).

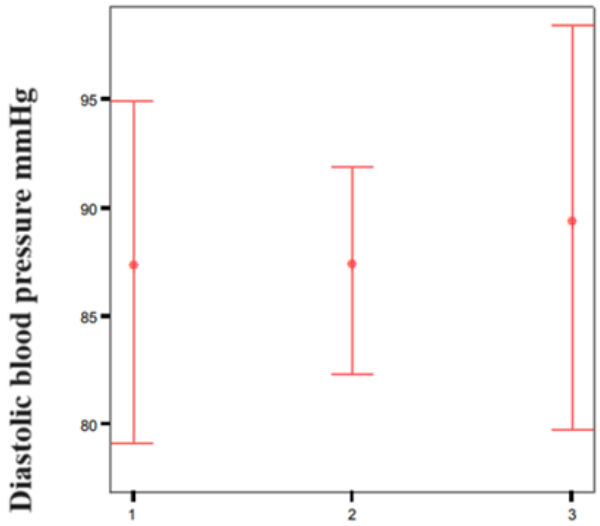

Figure 2. Relationship between diastolic blood pressure and HAM-D score (Depression No:1 Minor:2 Major:3)

The mean BMI of the three groups determined according to the HAM-D score was compared and the mean BMI was found to be 36.71 kg/cm² in the non-depression group whereas it was found to be 38.05 kg/cm² and 39.34 kg/cm² in the minor depression and major depression groups, respectively. In conclusion, no statistically significant difference was observed although there was an increase in the HAM-D score in patients with high BMI (Figure 3).

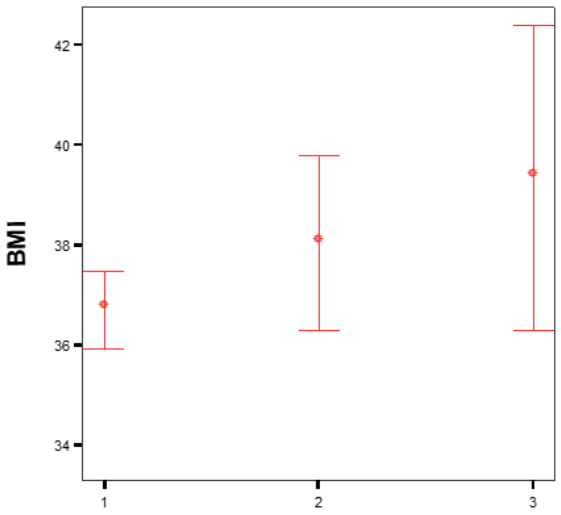

Figure 3. Relationship between BMI and HAM-D score (Depression No:1 Minor:2 Major:3)

The comparison of BMI groups and SBP showed that mean SBP was 128 mmHg in patients with a BMI of <35 kg/cm², 132 mmHg in patients with a BMI of 35-39 kg/cm² and 137 mmHg in patients with BMI of ≥40 kg/cm². As a result, SBP was found to increase with increasing BMI (Figure 4).

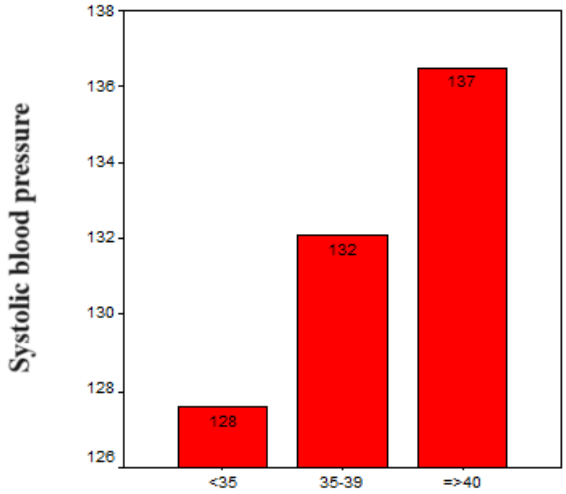

Figure 4. Relationship between SBP and BMI

The comparison of BMI groups and DBP showed that mean DBP was 82 mmHg in patients with a BMI of <35 kg/cm², 94 mmHg in patients with a BMI of 35-39 kg/cm² and 87 mmHg in patients with BMI of ≥40 kg/cm². As a result, there was no statistically significant relationship terms of DBP between the patients who were divided into groups according to their BMI groups (Figure 5).

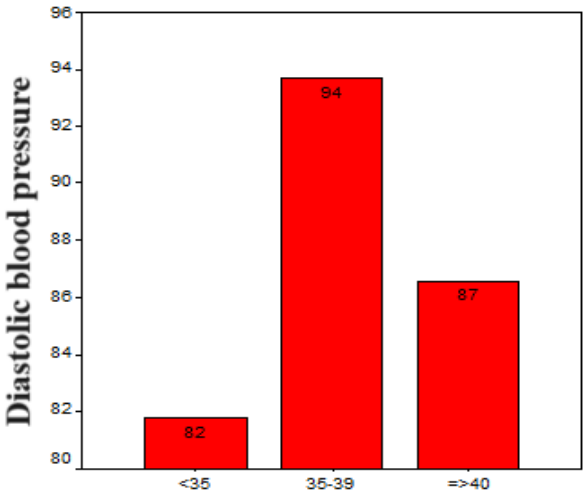

Figure 5. Relationship between DBP and BMI

DISCUSSION

In the present study, both increased BMI and HAM-D scores have been found to be associated with increased blood pressure. Based on these findings, it can be said that hypertension is directly correlated with BMI and depressive disorder independently of each other.

There is a close relationship between hypertension and obesity. Obesity is an important risk factor for the development of hypertension. The high coexistence of hypertension and obesity has caused the lifestyle modifications, particularly fighting against overweight, to be applied together with pharmacological treatment in the

prevention and treatment protocols of hypertension. The INTERSALT study, which is a multicentre study conducted in 32 countries, has revealed that the prevalence of hypertension is high in overweight individuals (5). The study conducted by Hatemi et al. (6), SBP and DBP have been shown to be highly correlated with BMI. Similarly, Brown CD et al. (7) have reported in their study that the increase in BMI in patients under the age of 60 is associated with an increase in mean SBP and DBP values and high blood pressure prevalence. In the present study, the comparison of BMI and SBP showed that mean SBP was 128 mmHg in patients with a BMI of <35 kg/cm², 132 mmHg in patients with a BMI of 35-39 kg/cm² and 137 mmHg in patients with BMI of ≥40 kg/cm². As a result, BMI increase has been shown to be associated with increased SBP. In contrast, no significant relationship was found between the increased BMI and DBP.

Psychological stress is often accompanied by hypertension (8). Many studies have been conducted to investigate the relationship between hypertension and depression, but different results have been obtained from these studies. In some studies, a relationship has been reported between the increased blood pressure and depression (9-12) whereas some studies have reported no relationship between these two (13,14). Some studies have shown that lower educational levels, life dissatisfaction, presence of chronic disease, physical diseases, and drug use are risk factors for depression (15-17). The results of our study are similar to the results of these studies. The HAM-D score was found to be significantly higher in the group with chronic disease and in the group who were receiving medication continuously. Considering the relationship between hypertension and depression, major depression has been shown to be a risk factor for newly developing high blood pressure in a study by Patten et al. (18) involving 12,270 patients. Similarly, Herman N et al. (19) followed 6,889 male and 3,413 female patients for 24 years in their study and reported that repeated episodes of depression increased the risk of hypertension. In a study by Andreia et al. (20), depression has been shown to have negative effects on blood pressure control in patients with hypertension and to contribute to the complications due to hypertension. In the present study, the increase in the HAM-D score caused a significant increase in SBP whereas no significant difference was observed between three groups divided according to their HAM-D scores in terms of DBP.

In the present study, we have found that there is a relationship between depression score and BMI with blood pressure.

CONCLUSION

Hypertension is one of the most common diseases in the world and is associated with high mortality. Diagnosis and treatment of hypertension is very important for public health. Patient's lifestyle, habits, BMI and psychological stress status are important in the prevention and management of hypertension. Family medicine is a first-line health care unit that not only treats patients but also evaluates the patient's negative lifestyle, habits, weight status and stress situations and provides correct guidance. This study demonstrates the association between depression and BMI with hypertension and importance of biopsychosocial approach of family medicine in the management of hypertensive patients.

Authors's Contributions: Idea/Concept: O.K.; Design: O.K.; Data Collection/Processing: G.A., C.Ö.; Analysis/Interpretation: O.K., G.C.; Literature Review: G.A., A.E.S.; Writing the Article: G.A., A.E.S.; Critical Review: E.E.

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