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Comparison of Eating Pathology in Patients Diagnosed with Diabetes and Hypertension

Diyabetik ve Hipertansif Hastalarda Yeme Bozukluklarının Karşılaştırılması

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ABSTRACT Objective: Patients with diabetes and hypertension must organize to follow a consistent diet and regulate their eating habits. Their minds busy with the diet lists, the foods that are forbidden, limited eating and weight control. The aim of this study is to compare and eating behaviors and psychological conditions of these patients. **Material and Methods:** 137 diabetic and 86 hypertensive patients presenting to Health Care Centers were included in the study. Eating Attitudes Test (EAT-40), Bulimic Investigatory Test, Edinburgh (BITE) and General Health Questionnaire (GHQ-12) were used in the study. **Results:** Mean age of the diabetic and hypertensive patients were 56.1±11.5 years and 53.8±13.1 years respectively. There were no statistically differences between two groups with respect to age, height, weight, highest weight and body mass index (BMI). There were no statistical differences between diabetic and hypertensive groups in terms of average BITE, EAT and GHQ score. According to Garner's cut-off value, we demonstrated that 19.7% of diabetic patients and 24.4% of hypertensive patients had disordered eating behavior. There were no statistical differences between two groups in terms of disordered eating behavior (P=0.64). When two groups were compared according to sex, there were no significant differences between average BITE, EAT and GHQ scores, between diabetic and hypertensive men, and between diabetic and hypertensive women. **Conlusion:** In our study, approximately one-fifth of the patients had disordered eating behaviour. The frequency of disordered eating behaviour were similar between two groups of patients. Patients with eating disorders should be guided towards nutritional health. Clinician should be careful about the eating disorders that may arise in these patients

Keywords: Eating disorders; diabetes complications; hypertension

ÖZET Amaç: Diyabetik ve hipertansif hastalar belirli bir diyeti takip etmek ve yeme alışkanlıklarını düzenlemek zorundadırlar. Zihinleri genel olarak diyet listeleri, yasaklanmış yiyecekler, kilo kontrolü ile meşguldür. Çalışmamızın amacı bu hastaların yeme alışkanlıklarını ve psikolojik durumlarını karşılaştırmaktır. **Gereç ve Yöntemler:** Çalışmaya Sağlık Ocaklarına başvuran 137 diyabetik ve 86 hipertansif hasta alınmıştır. Araştırma verileri Yeme Tutum Testi (YTT-40), Edinburg Bulimik Araştırma Testi (EBAT) ve Genel Sağlık Anketi (GSA-12) kullanılarak toplanmıştır. **Bulgular:** Diyabetik hasta grubunun yaş ortalaması 56,1±11,5 yıl iken, hipertansif hasta grubunun yaş ortalaması 53,8±13,1 yıl idi. Yaş, boy, kilo, en yüksek kilo ve beden kitle indeksi (BKİ) açısından gruplar arasında anlamlı bir fark bulunmamıştır. EBAT, YTT ve GSA-12 puan ortalaması açısından iki grup arasında anlamlı fark tespit edilmemiştir. Garner kesme değerine göre diyabetik hastaların %19,7'sinde ve hipertansif hastaların %24,4'ünde yeme davranışı bozuklukları saptanmıştır. Yeme davranışı bozuklukları açısından bu gruplar arasında istatistiki fark tespit edilememiştir (p=0,64). Her iki grupta cinsiyete göre EBAT, YTT ve GSA-12 puanları arasında fark bulunmamıştır. **Sonuç**: Çalışmamızda hastaların yaklaşık 1/5'inde yeme davranış bozuklukları tespit edilmiştir. Diyabetik ve hipertansif hastalarda benzer oranda yeme bozuklukları saptanmıştır. Klinisyenler yeme bozukluğu olan bu hastalarda dikkatli olmalı ve sağlıklı beslenme için onlara rehberlik edebilmelidir.

Anahtar Kelimeler: Yeme bozuklukları; diyabet komplikasyonları; hipertansiyon

Hypertension and diabetes mellitus are frequent and life-threatening diseases. Nearly one billion person is affected by hypertension globally and this value is expected to increase to 1.5 billion by

2025.[1] In 2013, 382 million people have diabetes, and it is expected to rise 55% to 592 million by 2035.[2] Hypertension and diabetes mellitus are strong and etiologically relevant risk factors for cardiovascular and renal diseases.[3,4]

A variety of chronic medical illnesses, which require dietary changes in treatment, may bring some additional risk of disordered eating. For everybody, it is hard to be on a diet for a long time. Overtime, this constant awareness of diet and restrictive attitude may lead to unhealthy eating habits and pathologic eating behaviors. Diet and weight control are essential components of a successful diabetes and hypertension management.[5,6] The goal here is to help the treatment of patients by modifying their diets properly. In hypertensive patients, dietary changes that lower blood pressure (BP) have the potential to reduce blood pressure and thereby lower the risk of hypertension-related clinical complications.[7] Several clinical trials have documented that weight loss lowers blood pressure.[6-9] Nutritional intervention is a key component in the management of type 2 diabetes. It requires behavioral changes in eating habits such as meal planning, food selection, food preparation and portion control. Diabetic patients encounter several difficulties in complying with the dietary regime. Compliance with such a dietary regimen can create some restrictive eating behaviors.[10] Eating disorders, especially bulimia nervosa (BN) and disordered eating behaviors (DEB) have increased in the context of diabetes, although studies with conflicting results have been conducted.[10-14] Moreover, it has been shown that eating disorders and pathologic eating behaviors are related to elevated levels of HbA1c.[15]

The diet in all chronic diseases is a matter of great importance. In general, diabetic patients are advised low carbohydrate diets, while hypertensive patients are advised low salt diets. This study aims to compare diet practices in diabetic and hypertensive patients (low carbonhydrate vs. low salt diet) in terms of eating disorders and pathologic eating behaviors. Furthermore, a comparison on two different diet practices along with their impacts on eating behaviors for two different diseases is carried out.

MATERIAL AND METHODS

This study was conducted in eight different centers among family health centers. Patients were chosen with simple random method between January 2014 and May 2014. A total of 223 patients were included in the study, 137 had diabetes (49 male and 88 female) and 86 had hypertension (26 male and 60 female). The study was approved by the Local Ethics Committee and each subject were informed consent prior to enrollment.

Hypertension was defined according to seventh report Joint National Committee for detection, evaluation and treatment of high blood pressure, as systolic BP more than or equal to 140 mmHg or diastolic blood pressure more than or equal to 90 mmHg or those individuals currently taking antihypertensive treatment.[3] Type 2 diabetes diagnosis was made according to American Diabetes Association criteria.[16] Patients with pregnancy, hepatic or renal dysfunction, hyperlipidemia, heart failure, ischemic or valvular heart disease, atrial fibrillation, respiratory disease, pulmonary hypertension, significant neurological disease and malignancy excluded from the study. All patients were specially asked about their dietary habits. A total of 342 interviews were conducted and 223 patients were enrolled in the study.

All participants completed self-report questionnaires which include the Eating Attitudes Test (EAT), Bulimic Investigatory Test, Edinburgh (BITE) and The General Health Questionnaire (GHQ-12). Body mass index (BMI) (weight (kg)/height $(m)^2$) was calculated based on self-reported height and weight.

Eating Attitudes Test (EAT): developed by Garner & Garfinkel is used to detect eating disorders in general.[17] The obtained results showed that this test was not appropriate as a diagnostic tool, but that it was good at detecting clinical cases in high-risk populations and identifying individuals with an abnormal preoccupation with their diet and weight. Its validity and reliability was conducted by a study in Turkey by Savasir and Erol.[18] The scale consists of 40 questions, the answers to

which were evaluated with a six-point Likert scale Items 1, 18, 19, 23, 27, 39, were scored in the following way: "sometimes" 1 point, "rarely" 2 points, and "never" 3 points; the other options were regarded as 0. For the rest of the items in the scale, "always" was graded as 3 points, "very often" as 1 point, and the other options were regarded as 0. The resulting scores ranged between 0 and 120 points and individuals scoring 30 points and over were considered as persons with a high risk of eating disorder.

The Bulimic Investigatory Test, Edinburgh (BITE) is a 33-item self-report measure, designed to identify subjects with symptoms of bulimia or binge eating.[19] The BITE consists of two subscales: Symptom Scale, which measures the degree of symptoms present, and the Severity Scale which provides an index of the severity of binging and purging behaviors as defined by their frequency. Results from the Symptoms scale were analyzed in this study. The maximum possible score is 30 for Symptom Scale. A symptom score of 20 or more indicates the presence of binge eating; the medium range (10-19) suggests an unusual eating pattern; the low range (0-10) falls within normal limits. The BITE is a well-validated and reliable instrument: the inter-item reliability coefficient was 0.96 for the symptom subscale and the test-retest reliability was 0.86 and 0.68 for non-clinical and clinical groups, respectively.[20] The BITE has been used in numerous samples including adolescents all over the world: it is easy to administer and the average time for completion is less than 10 minutes.[21]

The General Health Questionnaire (GHQ) is a detection instrument for individuals suffering from psychopathologic troubles.[22] The GHQ was originally developed as a 60-item instrument, but at present, shortened versions, including the GHQ-30, the GHQ-28, and the GHQ-12 are available The GHQ used in this study includes 12 items. Each item has the following 4 answer choices: not at all, no more than usual, more than usual, and much more than usual. Answers can be scored on a Likert-type scale (0-1-2- 3) or as (0-0-1-1) as suggested in the GHQ manual. Its Turkish reliability and validity study was evaluated by Kılıç.[23] The proposed cut-off point of the GHQ- 12 was 1/2, with a specificity of 0.84 and sensitivity of 0.74.

STATISTICAL ANALYSIS

Continuous variables were expressed as mean±SD. Categorical variables were expressed as percentages. Statistical analyses were performed by using SPSS program package (version 10 software, SPSS Inc. Chicago, Illinois, USA). Percentage and chi-square tests were used to compare mean values of the hypertensive and diabetic groups. The comparison of group differences and best discriminative items of EAT and BITE between hypertensive and diabetic groups were examined by analysis of variance (ANOVA) test. P value <0.05 was considered statistically significant.

RESULTS

Among the participants in diabetic group 88 were women, 49 were men. Twentysix of the hypertensive group were men and 60 were women. There were no statistical differences between two groups with respect to age, height, weight, highest weight and BMI (Table 1).

There were no statistical differences between diabetic and hypertensive groups in terms of average BITE, EAT and GHQ score (Table 2). According to Garner's cut-off value, we demonstrated that 19.7% of diabetic patients and 24.4% of hypertensive patients had disordered eating behavior. There were no statistical differences between two groups in terms of disordered eating behavior (p=0.64). In our study no patient had BITE score over 20, 59.9% of diabetic patients and 51.2% of hypertensive patients had medium range scores (between 10 and 19) suggesting unusual eating habit. There were no significant differences in medium range scores between two groups (p=0.203).

When two groups were compared according to sex, there were no significant differences between averages BITE, EAT and GHQ scores, between diabetic and hypertensive men, and between diabetic and hypertensive women (Table 2).

TABLE 1: Clinical Characteristics of the patients.

	Diabetic group (n=137) Mean±SD	Hypertensive group (n=86) Mean±SD	P value
Age (Years)	56.1±11.5	53.8±13.1	NS
Female, n (%)	88 (64.2)	60 (69.8)	0.02
Male, n (%)	49 (35.8)	26 (30.2)	0.008
Height (m)	1.6±0.8	1.6±0.8	NS
Weight (kg)	77.6±9.9	79.0±13.7	NS
Highest weight (kg)	84.6±11.3	83.8±14.3	NS
BMI (kg/m^2)	28.6±4.2	28.5±4.6	NS

BMI; Body Mass Index. NS; Nonsignificant.

TABLE 2: BITE, EAT-40 and GHQ-12 score of the patients

	Diabetic group (n=137) mean±SD	Hypertensive group (n=86) mean±SD	P value
BITE symp	10.4±3.5	9.6±2.9	0.09
EAT	20.7±11.4	21.8±12.5	0.53
GHQ	13.0±6.4	11.8±7.1	0.18
	Diabetic women (n=88)	**Hypertensive women (n=60)**	
BITE symp	10.32±3.32	9.92±2.94	0.45
EAT	23.43±11.87	21.83±12.18	0.43
GHQ	13.53±6.03	11.92±7.06	0.14
	Diabetic men (n=49)	**Hypertensive men (n=26)**	
BITE symp	10.74±3.95	9.15± 2.99	0.10
EAT	16.06±9.10	21.81±13.55	0.07
GHQ	12.29±7.04	11.73±7.35	0.74

BITE; Bulimic Investigatory Test, Edinburgh, EAT; Eating Attitudes Test, GHQ-12; General Health Questionnaire.

DISCUSSION

In our study, disordered eating behavior was noted in about one fifth of both the patient groups. Also, unusual eating habits were observed approximately at a ratio of 50% in both groups. These results of diabetic patients were in accordance with the literature.[10-12] Eating disorders did not show differences with respect to sex.

Jones et al. studied 356 females aged 12-19 years with type 1 diabetes.[24] They found that bulimia nervosa and eating disorders not otherwise specified were more than twice as common in girls with diabetes compared to controls. The most extensive study investigating eating disorders in diabetic patients was done by Herpertz et al.[12] In that study, prevalence range of eating disorders were found as 8% current and 14% lifetime. They found that in those with disordered eating, 60% had binge-eating disorder. Papelbaum et al. reported that occurence of eating disorders increased in type 2 diabetes mellitus patients compared to rates observed in the general population, with the predominance of binge eating disorder.[25] They reported that presence of an eating disorder was associated with higher rates of anxiety disorders. Anxiety has been reported to be as high as 30-40% in persons with diabetes.[26] Several studies have found the presence of an anxiety disorder to be associated with poor glycemic control for patients with diabetes and researchers have suggested that anxiety disorders may be a risk factor for more di-

abetes complications, depression and worse quality of life.[27,28] We found no statistical difference between two groups in terms of GHQ-12 scores.

A meta-analysis of randomized controlled trials on people with or without hypertension showed that an average weight loss of 5.1 kilograms reduced systolic blood pressure by 4.4 mmHg and diastolic blood pressure by 3.6 mmHg.[9] Adequate weight loss reduce the requirement (number and doses) of antihypertensive medications in patients with hypertension.[29] Sodium restriction in the diet plays a critical role in lowering blood pressure. Dietary Approaches to Stop Hypertension (DASH) demonstrates that a diet should be rich in fruits, vegetables, low-fat dairy products, fiber and minerals.[7]

Due to starting age of type 1 diabetes being in early ages and more frequent observation of eating disorders and problems with body image, studies on eating disorders are generalIy performed with type 1 diabetic patients. There are few studies on eating disorders in type 2 diabetic patients.

We anticipated a higher rate of eating disorders in diabetic patients than that of hypertensive patients. Substantial fluctuations in blood glucose and insulin levels may cause changes in eating behavior, which has also been shown in several studies.[10-14] Without sufficient insulin, glucose has no ability to get into the cells to be used or to be stored in the cell, resulting in hyperglycemia and an increase in hunger. Likewise, exogenous insulin administration results in hunger along with an increased appetite, which is reflected in eating behavior changes.[26] Sodium restriction is the mainstay in treatment of hypertension. A low-salt diet may be expected to cause fluid and electrolyte alterations. Eating disorders in hypertensive patients have not been investigated in detail. In our previous study, we investigated whether the dietary appilcations in hypertensive patients were correlated with eating disorders or not.[30] We found that, compared to normal subjects, patients with hypertension exhibited higher EAT and BITE scores. In this study, 19.7% of diabetic patients and 24.4% of hypertensive patients had eating disorders, which is an important finding that requires further research.

CONCLUSION

In our study, eating disorders was observed in hypertensive patients as well as in diabetic patients. There were no significant differences in ratio of eating disorders in both groups. This finding shows that two different type of diets do not affect the eating behavior of patients in different ways. During clinical follow up it should be considered that there may be eating disorders with the patients, with illnesses like diabetes and hypertension. Factors like eating behavior, weight control and pyhsical activity should be regulated. Clinician should be careful about the psychological and medical complications that may arise in these patients.

Study limitations: Our study was a self-report study. Further studies are warranted for better definition of the errors in self-reported questionnaires.

Conflict of Interest

Authors declared no conflict of interest or financial support.

Authorship Contributions

Study Conception: *Atila Erol, Gülgün Durat, Cennet Yıldız;* ***Study Design:*** *Atila Erol, Gülgün Durat;* ***Acquisition of Data:*** *Gülgün Durat, Cennet Yıldız;* ***Analysis and Interpretation of Data:*** *Atila Erol, Gülgün Durat, Cennet Yıldız;* ***Drafting of Manuscript:*** *Cennet Yıldız, Gülgün Durat;* ***Critical Revision:*** *Atila Erol.*

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