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Correlation of binge eating disorder with level of depression and glycemic control in type 2 diabetes mellitus patients

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ABSTRACT

Objective: It is reported that eating disorders and depression are more common in patients with type 2 diabetes mellitus (T2DM). In this study, we aimed to determine the prevalence of binge eating disorder (BED) in T2DM patients and examine the correlation of BED with level of depression and glycemic control.
Method: One hundred fifty-two T2DM patients aged between18 and 75 years (81 females, 71 males) were evaluated via a Structured Clinical Interview for *DSM-IV* Axis I Disorder, Clinical Version in terms of eating disorders. Disordered eating attitudes were determined using the Eating Attitudes Test (EAT) and level of depression was determined using the Beck Depression Scale. Patients who have BED and patients who do not were compared in terms of age, gender, body mass index, glycosylated hemoglobin (HbA1c) levels, depression and EAT scores.
Results: Eight of the patients included in the study (5.26%) were diagnosed with BED. In patients diagnosed with BED, depression and EAT scores were significantly high ($P<.05$). A positive correlation was found between EAT scores and depression scores ($r=+0.196$, $P<.05$). No significant difference was found in HbA1c levels between patients with BED and those without ($P<.05$).
Conclusions: T2DM patients should be examined in terms of the presence of BED and disordered eating attitudes. Psychiatric treatments should be organized for patients diagnosed with BED by taking into consideration comorbid depression.

1. Introduction

Diabetes mellitus (DM) has become increasingly common throughout the world [1]. In a study conducted in 2010, the incidence in adults was reported as 6.4% [2]. Type 1 diabetes is related to insulin deficiency, whereas type 2 diabetes is related to insulin resistance secondary to obesity [3]. More than 80% of all patients had type 2 diabetes, whereas in Turkey, the prevalence of type 2 diabetes is about 2.5%–6% [4]. Psychiatric disorders such as eating disorders and depression are quite common in patients with type 2 diabetes mellitus (T2DM) [5,6]. Pibernik-Okanovic et al. [7] reported major depression at a rate of 33% in T2DM patients, according to *Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition* (*DSM-IV*) diagnostic criteria, whereas Téllez-Zenteno and Cardiel [8] reported depression at a rate of 39%. In a study conducted in Turkey [9], the incidence of major depression in T2DM patients was reported as 58.9%, according to *DSM-IV* diagnostic criteria, whereas in another study [10], it was reported as 47%.

It has been found that in T2DM patients, weight gain, body dissatisfaction, history of dieting and depression play a role in the development of eating disorders [11]. It has also been established that the most common eating disorder is binge eating disorder (BED) in this group [6]. The prevalence of BED in the general population is 3.5% in females and 2% in males [12], while it has been reported in studies of T2DM patients that the prevalence is in the range of 2.5%–25.6% [13,6]. BED is a disorder that is included under the eating disorder not otherwise specified (EDNOS) diagnostic category in *DSM-IV*. The research diagnostic criteria for BED are listed in Annex B of *DSM-IV* and *DSM-IV-TR* [14]. BED is quite similar to bulimia nervosa which is recurrent episodes of binge eating and losing control of eating during these episodes. BED does not involve inappropriate compensatory behaviors that occur in bulimia nervosa for the aim of avoiding weight gain, such as use of laxatives, excessive exercise and vomiting, whereas BED involves eating more rapidly than normal, eating despite lack of physical hunger, and eating until feeling uncomfortably full. Eating episodes that involve these criteria happen for at least 6months and at least two times a week. In the studies conducted with T2DM patients, BED has been a focus [15]. In this patient group, dietary limitations may cause disorders in eating attitudes and binge eating episodes [16]. It is reported that patients with BED show

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higher rates of depression [17,6] and that depressive symptoms may cause a disorder in eating attitudes [18]. It is also debated in T2DM patients whether disordered eating attitudes and binging episodes are correlated with glycemic control [6,19].

Based on the above information in the literature, this study aimed to test three hypotheses: (1) the prevalence of BED will be higher in T2DM patients that apply to the hospital than in the general population; (2) there is a significantly positive correlation between BED and level of depression; and (3) BED adversely affects glycemic control.

2. Materials and methods

2.1. Participants and procedures

Our inclusion criteria included 152 patients between ages 18 and 75 years. They were drawn from patients who were followed at the Diabetes Outpatient Clinic of Şişli Etfal Training and Research Hospital for T2DM between the dates 01.03.2013–01.06.2013, with consecutive applications to the clinic. Our exclusion criteria were as follows: (1) illiterate patients; (2) patients with mental retardation; (3) those with delirium, dementia, amnesic or other cognitive disorders; (4) schizophrenia and other psychotic disorders; (5) mood disorders; (6) alcohol and substance abuse and addiction according to *DSM-IV* diagnostic criteria; and (7) those using any kind of psychotropic drugs. Before the study began, necessary permission was obtained from the ethics committee of our hospital (no. 342, dated 19.02.2013). Patients were informed of the aim and grounds of the study and those patients who signed the approval form were included. Diabetes patients included in the study were given a sociodemographic and clinical characteristics form, Eating Attitudes Test (EAT) [20] and Beck Depression Scale (BDS) [21]. Diagnosis of an eating disorder was reached by psychiatrist who was blinded to the study, upon application of the eating disorder section of the Turkish language form [22] of Structured clinic interview research form for Axis 1 disorders [23].

In the study, the body mass index (BMI; kg/m^2), glycosylated hemoglobin (HbA1c) levels showing the glucose level of the last 120days in the blood, as well as the compliance to diet and exercise and drug use were recorded. Those with BMI $<25 kg/m^2$ were evaluated as normal weight, 25–29.9kg/m^2 were overweight and those ≥ 30 were obese [24]. HbA1c values <7% were regarded as good glycemic control, and HbA1c values ≥7% were regarded as poor glycemic control [25]. Dietitian supervised the patients ≥3days a week was considered as dietary compliance. Exercising for at least half an hour ≥3days a week was considered as exercise compliance, whereas failure to take drugs ≥1 times a week was considered as noncompliance to drug (treatment) and taking the drugs regularly was considered as drug (treatment) compliance [25].

2.2. Measures

2.2.1. Sociodemographic and clinical characteristics form

This is a semistructured interview chart in which information such as age, gender and educational level is investigated, and clinical characteristics on diabetes (BMI, duration of the disease, HbA1C, dietary compliance, exercise compliance, treatment compliance, etc.) are also included.

2.2.2. Eating Attitudes Test

This is a 40-item scale based on self-reporting. It was developed by Garner and Garfinkel [20] for screening purposes in order to detect adolescents older than eleven who have eating disorders. It was developed with the aim of evaluating possible disorders in eating attitudes of patients both with and without eating disorders. The validity and reliability of the Turkish version was established by Erol and Savaşır [26]. In this study, 30 points and above was considered as the cutoff score for disordered eating attitude.

Table 1
Sociodemographic and clinical characteristics

N	152
Age, mean years (S.D.)	55.0 (9.2)
Sex, %	
Male	46.7
Female	53.3
Education, %	
Less than high school graduate	83.6
High school graduate	10.5
University/College	5.9
Duration of DM, mean years	6.41 (6.2)
HbA1c	8.11 (2.0)
BMI	30.99 (5.0)
Exercise compliance, %	44.1
Diet compliance, %	41.4
Medication compliance, %	67.8
BDS	
Total score (S.D.)	9.53 (7.73)
<17, %	81.6
≥17, %	18.4
EAT	
Total score	24.82 (11.31)
<30, %	70.4
≥30, %	29.6

S.D.: standart deviation; HbA1c: hemoglobin A1c.

2.2.3. Beck Depression Scale

This measures physical, emotional and cognitive symptoms observed in depression. It is a self-evaluation scale that includes 21 symptom categories. It was developed by Beck et al. [21], and the validity and reliability of the Turkish version was established by Hisli et al. [27]; the cutoff score was determined as 17.

2.3. Statistical analysis

The data were analyzed using SPSS 17.0/Windows. Descriptive statistics were used in the evaluation of the general characteristics of the patients and the survey test data. Between-groups significances were evaluated using chi-square and Fisher tests for qualitative data and independent-samples *t* test, Mann–Whitney *U* and Kruskal–Wallis tests for quantitative data. The correlations between age, HbA1c, BMI, BDS and EAT scale scores were evaluated through Spearman correlation analysis. The limit for statistical significance was set as $P<.05$.

3. Results

Of the 152 patients included in the study, 53.3% ($n=81$) were females and 46.7% ($n=71$) were males. Average age was 55.01±9.23 and the duration of diabetes was 6.41±6.25. The demographic and clinical characteristics of the patients are summarized in Table 1. One patient was diagnosed with EDNOS and 8 (5.26%) with BED. No anorexia nervosa or bulimia nervosa cases were detected.

The average BDS score was 9.53±7.73, whereas the average EAT scale score was 24.82±11.31. Forty-five patients (29.6%) who scored 30 points or above on the EAT scale were considered to have a disordered eating attitude (Table 1).

Table 2
Analysis of HbA1c, BMI and scores of the scales according to sex ($N=152$)

	Mean (S.D.)		*P* unadjusted
	Male ($n=71$)	Female ($n=81$)	
HbA1c (S.D.)	7.86 (1.79)	8.32 (2.23)	.163
BMI	29.44 (3.64)	32.36 (5.65)	.000
BDS, total score	7.98 (6.62)	10.91 (8.40)	.020
EAT, total score	21.45 (9.60)	27.77 (11.92)	.001

HbA1c: hemoglobin A1c; S.D.: standart deviation.