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Original Article

Relationship between eating attitude and attention deficit and hyperactivity disorder in a group of bariatric surgery candidates: A pilot study

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Abstract

Aim: Attention deficit and hyperactivity disorder (ADHD) is more common in bariatric surgery candidates who are more failed to lose weight. We decided to evaluate eating attitudes and ADHD in a group of bariatric surgery candidates.

Material and Methods: We created a study group from bariatric surgery candidates (n=40) from outpatient psychiatry clinic of Haydarpasa Numune Training and Research Hospital. Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I), Wender-Utah Rating Scale (WURS), Adult attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD), DSM IV- based diagnostic screening and rating scale, Beck depression inventory (BDI) and eating attitude test (EAT) were applied to all participants.

Results: 77.5% of 40 bariatric surgery candidates (n=31) were women. Rate of childhood ADHD was 17.5% based to WURS cut off point. Rate of adult ADHD was found 7.5%. Mean point of total Adult ADD/ADHD DSM IV- based diagnostic screening and rating scale score was 36.12±20.55. Mean point of attention deficit score was 6.35±4.62, hyperactivity score was 6.07±4.99 and related properties score was 23.72±13.86. Mean point of EAT was 24.20±10.61. Mean point of BDI score was 14.05±+9.47.

Conclusion: Symptoms of adult ADHD, childhood ADHD, disordered eating patterns and high levels of depressive symptoms are common and that they are positively correlated in bariatric surgery candidates (BSCs). Some factors about ADHD (total ADHD score and related factors with ADHD) have a clear association with eating attitude. All these factors must be taken into consideration by treatment team of BSCs.

Keywords: Attention deficit and hyperactivity disorder; bariatric surgery; binge eating disorder; eating attitude;morbid obesity

INTRODUCTION

Bariatric surgery is a definitive treatment for morbid obesity which affects an increasing number of individuals worldwide. 70–86% of obesity patients experience clinically relevant improvements in obesity-related comorbidities (e.g., hypertension, diabetes mellitus, dyslipidemia) following bariatric surgery (1). Despite good long term results of bariatric surgery are known, some patients experience regaining weight or loosing less weight than expected after procedure due to multiple factors (5-9%) (2). The risk factors for unsuccessful weight loss after bariatric surgery are poorly understood. Psychiatric factors take an important place in weight gain process. Anxiety, depression, disordered eating patterns and attention-deficit / hyperactivity disorder (ADHD) are most studied psychiatric factors associated with this issue (3).

ADHD is a common situation in bariatric surgery candidates. Even though different studies report different results, the prevalence of ADHD is nearly 10-38% in bariatric surgery population (4,5). The relationship between obesity and ADHD is very sophisticated. It has been suggested that symptoms of ADHD (impulsivity-hyperactivity, inattention and reward sensitivity) are obesogenic (6,7).

It is still unclear whether the symptoms of ADHD are risk factors for obesity, whether ADHD and obesity share a common neurological ground or whether some other common factors exist (8). Obesity, eating disorders and ADHD probably use reward mechanism and affect each other on this pathway (9). When considered from this point of view, ADHD may affect bariatric surgery course by different ways. For example impulsivity is a characteristic hallmark for ADHD and eating disorders. It is supposed to have negative consequences on diet and eating attitudes. Poorer adherence to post-surgery appointments, greater alcohol consumption and grazing are some of problems may occur in this process. But evidence about effect of

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ADHD on weight control and adherence to treatment protocol are limited (7,10).

Binge eating is a kind of disordered eating that is usually studied on bariatric surgery candidates (11). Binge eating disorder (BED) is known to be prevalent in individuals with obesity (de Zwaan, 2001). It may influence weight loss treatment procedure from beginning to end and affect up to 30% in these samples (12). Previous research results showed that obese individuals with BED exhibit more food related or food-unrelated impulsivity than obese individuals without BED (13,14).

Limited number of study show an association between obesity, binge eating and attention deficit hyperactivity disorder (15,16). We aimed to determine the associations between eating attitudes, binge eating, childhood and adult ADHD in a group of bariatric surgery candidates and make contribution to literature with our study data from Turkey. A secondary aim was to investigate whether the symptoms of adult ADHD, depression and disordered eating positively correlated with each other.

MATERIAL and METHODS

Sample

Inclusion criteria were being super-obese (BMI >50), morbidly obese (BMI >40) or severe obese (BMI 35-40) with at least one co-morbidity in preparation for bariatric surgery and patients, agreed to participate in the study with written informed consent. Patients who satisfy those conditions were consecutively included in the study. Exclusion criteria were being under the age of 18 or older than 60, illiteracy, being visually handicapped, diagnosis of psychosis, mental retardation, and history of neurologic diseases for example dementia or the presence of any condition affecting the ability to complete the assessment.

Data collection instruments

Body Mass Index: Height and weight are measured using a stadiometer and an electronic scale to calculate body mass index (BMI). Weight in kilo-grams is divided by the square of the height in meters (kg/m2).

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I): It is a structured clinical interview applied by the interviewer to investigate the diagnosis of Axis-I psychiatric disorders. It consists of six modules. The application lasts 30-60 minutes on average. It has been developed by First et al (17). Turkish validity and reliability study was done by Özkürkçügil et al (18).

Adult ADD/ADHD DSM IV- Based Diagnostic Screening and Rating Scale: This scale consists from 3 parts (Attention deficit, Hyperactivity/ impulsivity and features with ADHD) and developed by Turgay et al (19). First and second part contain total 18 questions, third part contains 30 questions. The ADHD scale is an expanded rating scale of 0 to 3: 0 = never, 1 = sometimes, 2 = often, 3 = very often. Each item asks how often a symptom occurred over the past 6 months on a 4-point Likert scale: 0 for never, 1 for sometimes, 2 for often, and 3 for very often. Turkish validity and reliability were assessed by Gunay et al (20).Internal reliability calculated as Cronbach's Alpha =0.9566.

Wender-Utah Rating Scale (WURS): It was developed to inquire retrospectively into symptoms of ADHD in childhood and to help to diagnose ADHD in adults (21). WURS is a self-report scale, adults with ADHD are scored with 25 items that were found to discriminate best from healthy controls. It is a five-point Likert type self-reporting scale (0 = no, 4 = extreme) where each item is rated 0-4. The total WURS score is between 0 and 100. The cut-off score was set to 36. When this cut-off point was taken, sensitivity was 82.5% and specificity was 90.8%. Turkish form of WURS demonstrated excellent internal consistency (Cronbach's alpha= 0.93), and the test-retest coefficient for the WURS (total score) was 0.81

It has been shown to be a valid and reliable scale to help the clinician in diagnosing ADHD in adults. Turkish validity and reliability were performed by Öncü et al (22).

Eating Attitudes Test (EAT): Eating Attitudes Test was developed by Garner and Garfinkel to assess the potential disorders of eating behaviors (23). Eating Attitudes Test is a 40-item, six point likert-type rating scale with a cut-off score of 30 points. Increase in total scores refers to a higher severity of psychopathology. The validation study for Turkish was made by Savasir and Erol (24). Internal consistency of Turkish form of EAT calculated Cronbach's alpha=0.70.

Beck Depression Inventory (BDI): This scale assesses somatic, emotional, cognitive and motivational symptoms seen in depression (25). It is a 21-item, four point likert-type, self-rating scale. Each 21 item has 4 choices. Each item is scored between 0 and 3. The scale used to rate the severity of depressive symptoms within a score range of 0-63 points. Increase in scores refers to a higher severity of depression. The validation study for Turkish was made by Hisli. 17 points was determined as cut-off point for BDI (26). Arkar and Safak calculated Cronbach's alpha=0.90 (27).

Procedure

BSCs admitted to Haydarpaşa Numune Training and Research Hospital were evaluated at presurgical psychiatric interview. All bariatric surgery candidates were first evaluated by the departments such as general surgery, endocrinology, psychiatry and a dietitian individually before the operation. Then, all patients were evaluated in a bariatric surgical council, consisting of a psychiatrist, an endocrinologist and at least a general surgeon through a multidisciplinary perspective. Data for this study were obtained from pre-surgical evaluation phase. Information was given about the study and patients who wanted to participate were consecutively included. Two patients refused to participate the study. One patient with mental retardation was excluded.

The study procedure included two phases: 1. Sociodemographic and clinical information (general medical status) were retrieved from story, examination and medical files (medical tests made in our hospital) of patients. A psychiatrist examined all bariatric surgery candidates by Structured Clinical Interview for DSM-IV Axis I Disorders (SCID I) and for diagnosis of ADHD and BED based on DSM-V. 2. Self-administered questionnaires completed by bariatric surgey candidates. Adult ADD/ADHD DSM IV- Based Diagnostic Screening and Rating Scale, Wender-Utah Rating Scale (WURS), eating attitude test (EAT), Beck depression Inventory (BDI) were applied.

Statistical analysis

Analysis performed with SPSS 22.0.descriptive statics were used for sociodemographic data. Bivariate correlation analyzing was used to evaluate relationship between eating attitude test, Adult ADD/ADHD DSM IV-Based Diagnostic Screening and Rating Scale , Wender-Utah test score and Beck depression inventory.

RESULTS

77.5% of 40 bariatric surgery candidates (n=31) were women. Mean age of BSCs was 35.72±9.48 (min. 22-max.54) years. Mean point of BMI was 46.20 ±5.53 kg/m^2.

Psychiatric evaluation made by a psychiatrist based to SCID-I. Distribution of psychiatric disorders were major depression 20.0%, obsessive compulsive disorder 2.5%, generalized anxiety disorder 7.5%, dysthymia 7.5%, social phobia 7.5%, social phobia 27.5% panic disorder 5.0%. Other disorders like post-traumatic stress disorder, bulimia, anorexia nervosa were not found. Rate of BSC for at least one psychiatric disorder was found as 25.0%, two psychiatric disorders 15.0%, and three psychiatric disorders 7.5%.

Mean point of EAT was 24.20±10.61. When eating characteristics were evaluated, it is seen that 7 BSCs (17.5%) had binge eating disorder. Data of all BSCs about Binge eating disorder are detailed. Rate of "eating quickly much more than normal" is 70%, "eating until uncomfortably full" 35.0%, "eating large amounts of food even when not physically hungry" 32.5%, "eating alone because of embarrassment about how much one is eating" 25.0%, "feeling disgusted with oneself, depressed or very guilty afterward" 40%.

When cut off value of EAT accepted 30, we found that 14 of BSCs had disordered eating. Relationship between EAT and other scale scores are shown in Table 2.

Table 1. Sociodemographic characteristics of BSCs

	%
Gender	
Male	22.5%
Female	77.5%
Marital status	
Single	37.5%
Married	57.5%
Divorced	5.0%
Educational status	
Primary school	32.5%
Secondery school	12.5%
College	35.0%
University	20.0%
Familial psychiatic story	
Yes	12.5%
No	87.5%
General medical status	
Yes	47.5%
No	52.5%

Table 2. Relationship between EAT and other scale scores

	EAT<30 N=26	EAT>30 N=14	t	p
BDI	11.46±7.37	18.85±11.25	-2.508	0.017
WURS	22.23±12.44	28.00±20.69	-1.104	0.276
Adult ADD/ADHD Total score	32.03±15.93	43.71±26.13	-1.759	0.087
Hyperactivity/ impulsivity score	5.50±4.98	7.14±5.03	-0.991	0.328
Features with ADHD score	20.76±10.12	29.21±18.16	-1.897	0.065
Attention deficit score	5.76±3.74	7.42±5.03	-1.084	0.285

Adult ADD/ADHD: Adult ADD/ADHD DSM IV- Based Diagnostic Screening and Rating Scale, WURS: Wender-Utah Rating Scale, EAT:Eating Attitude Test score, BDI:Beck Depression Inventory, * p <0.05

Rate of childhood ADHD was 17.5% based to WURS cut off point. 7.5% of BSCs (n=3) were meeting both childhood and adulthood ADHD. Mean point of WURS score was 24.25±15.80.

Rate of adult ADHD was found 7.5%. Mean point of total Adult ADD/ADHD DSM IV- Based Diagnostic Screening and Rating Scale score was 36.12±20.55. Mean point of attention deficit score was 6.35±4.62, hyperactivity score was 6.07±4.99 and related properties score was 23.72±13.86.

Mean point of BDI score was 14.05±9.47. There was a positive significant correlation between EAT sore and BDI score (r=0.458**, p=0.003).

Table 3. Correlations between scales

	EAT (r)	BDI (r)
Adult ADD/ADHD Total score	**0.33***	**0.57****
Hyperactivity/ impulsivity score	**0.23**	**0.18**
Features with ADHD score	**0.33***	**0.58****
Attention deficit score	**0.25**	**0.60****
WURS	**0.29**	**0.49****

Adult ADD/ADHD: Adult ADD/ADHD DSM IV- Based Diagnostic Screening and Rating Scale, WURS: Wender-Utah Rating Scale, EAT: Eating Attitude Test score, BDI:Beck Depression Inventory
***p <0.05, ** p < 0.01**

DISCUSSION

The results of our study support the idea that symptoms of adult ADHD, childhood ADHD, disordered eating patterns and high levels of depressive symptoms are common and that they are positively correlated in BSCs. According to current study results rate of adult ADHD was found 7.5% and childhood ADHD was 17.5%. Rate of adult ADHD was lower than we expected but is materially higher than the rate in the general population (28). When literature is reviewed it is seen that rates of adult ADHD symptoms in BSCs rank as a large gap (10-38%) (5). This difference may be based on genetic factors, study designs or methods like distinction of selected scales. For example in two different studies made by using a different scale, ADHD Self-Report Scale Screener (ASRS-S), from Sweden report rates of Adult ADHD as 10.2% and 8.6% (5,29). These rates were comparable to rate of ADHD in our study result.

Another interesting finding of our study was about disordered eating (Mean of EAT was 24.20±10.61). In the current study, the proportion of positive participants screening based DSM-5 criteria for binge eating disorder was found 17.5% in BSCs. This rate was too close to a meta-analysis result about rate of BED (17%) in patients seeking and undergoing bariatric surgery (11). We found a similar EAT score (mean point of EAT 23.2+9.9) but lower disordered eating rate (23.1%) in our recent study in a different sample of BSCs from same center. Also the rate of BED was found as 11.1% (30). Diagnosis of BED was based on DSM 5 in both our studies. Prevalence of BED changes from through different countries. Rates of BED were found as 8.2 % and 6.3% in studies from Sweden aforementioned above (5,29). Prevalence rates of BED (27-49%) were found usually high for patients undergoing bariatric surgery in literature (31-33). At this stage we noticed that the role of different methods for diagnosing BED becomes prominent because prevalence rates of BED change widely depending on assessment methods. Also we must keep key differences of sociocultural and genetic factors in the forefront too.

When we evaluated eating attitudes and ADHD relationship in a detailed manner, we identified that some factors about ADHD have a clear association with eating attitude. For example "total ADHD score" and "related factors with ADHD score" show positive correlations with eating attitude score (Table 2). This could be an effect of using self-report measures for ADHD symptoms and disordered eating pattern. In a recent study, rate of BED was not higher in BSCs with ADHD than BSCs without ADHD (5). We didn't analyze the association between ADHD and BED because of small sample size. As a hypothesis in need of empirical investigations, relationship between disordered eating patterns or BED might be a risk factor for less weight loss after surgery.

Still there is a doubt about underlying neurobiological mechanism of disordered eating and ADHD. It is argued that food may be used to increase dopaminergic transmission and reduce the hypodopaminergic state that has been associated with ADHD (34). Alternatively, organization deficits found in ADHD may contribute to inadequate meal planning and tendency to seeking pleasurable excitation cause externally motivated eating and favoring abnormal eating behavior (35,36). To understand the relationship of these disorders in obese people, authors explored the prevalence of ADHD symptoms in obese individuals with BED and without BED. No difference was found in recent study results (37,38).

This study showed that BSCs often present with marked levels of depression (BDI Mean=14.05±9.47). According to our recent study that we mentioned above we found mean point of BDI as 13.83±9.85. Depression is a very common psychiatric disorder in BSCs (11). Prevalence of depression in our study was similar to the literature (20%). Matini et al. found prevalence of depression as 23.9% (39). Obesity and related difficulties in social, occupational, familial, marital and medical areas provide basis for depressive symptoms. Also the female majority of the study group may be efficient on determination of high depression levelsbecause depression is common in female gender. Our study results point that depression is associated with both childhood and adulthood

ADHD. "Attention deficit" seems to be more related with depression than "impulsivity" according to our data (Table 3). In a study BSCs with ADHD and without ADHD were compared and BDI scores were found significantly higher in BSCs with ADHD (20.4±9.6 vs 13.9 ±8.1, p=0.015) (4). On the other hand different results about association between depression and ADHD in obese people join in the literature. A lack of association between depressive disorders and ADHD has also been demonstrated by some studies (7,28).

When we evaluate the relationship between eating attitude and BDI scores we found that there was a positive significant correlation. Disordered eating may have a role on coping with depressive symptoms in BSCs. Association between eating disorders and depression in BSCs was conflicting in literature. It is reported that depressive symptoms were higher in pre-bariatric patients with BED (38). Also no relationship was found in BDI scores between BSCs with and without eating disorders in another study (30).We couldn't compare BDI of BSCs with and without BED by reason of small sample size.

Limitations of the study include the cross-sectional design and the small sample size. For example we couldn't compare BDI of BSCs with ADHD and without ADHD by reason of small sample size. As this study designed as a pilot study we decided to perform a similar study with a large sample. Concerns of BSCs about receiving approval for surgery may affect their answers to questions. The findings pertain to a group of BSCs who applied to a metro pole training and research hospital. The findings may not generalize to all obese patients.

CONCLUSION

The current study confirms previous findings. Despite having some limitations, it provides new insights to the prevalence of ADHD and BED for BSCs in Turkey. Secondly, the study highlights the association between ADHD symptoms (in both childhood and adulthood) and eating attitude or level of depression in BSCs. As a new area of investigation, ADHD in bariatric surgery seems to be a research of topic worth pursuing. In addition, much more follow up researches needed for understanding exact effect of ADHD about weight loss in this group.

Competing interests: The authors declare that they have no competing interest.

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