Original article / *Araştırma*

Night eating behavior and psychiatric comorbidity in patients with morbid obesity

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ABSTRACT

Objective: *The relationship between night eating syndrome (NES) and obesity resembles a vicious circle. The presence of NES facilitates the shift to obesity, whereas the NES is more common in obese individuals. In the literature, the frequency of NES is reported as 2-20% in individuals with morbid obesity. In addition to obesity, the presence of NES was associated with higher depression scores and lower self-esteem. The aim of this study was to investigate the prevalence of NES and related factors in morbid obesity patients.* ***Methods:*** *In this study, 452 patients who applied for psychiatric evaluation before the bariatric surgery were evaluated. The presence of psychiatric disorder was assessed by a clinical interview conducted by a psychiatrist. Sociodemographic and clinical features such as age, gender, education level, body mass index were also recorded. Beck Depression Inventory (BDI) and Beck Anxiety Inventory (BAI), Rosenberg Self Esteem Scale (RSES), and Night Eating Questionnaire (NEQ) were administered.* ***Results:*** *Fifty-nine (13%) of 452 morbid obesity patients were found to have NES. BDI, BAI, and RSES scores were significantly higher in the group with NES than without NES. In the group with NES, compared with non-NES; the rate of psychiatric disorder (44.1% and 26.2%, respectively) and depressive disorder (respectively, 25.4% and 13%) were significantly higher. The risk of developing NES in smokers increased by 3.05 fold; and a 1 unit increase in the BDI increases the risk of developing NES by 1.05 fold in the morbid obez sample.* ***Discussion:*** *In our study, it was found that comorbidity of NES in morbid obesity patients increased the risk of psychiatric disease, especially depression, and self-esteem was worse in these patients. The fact that smoking is the highest predictor factor for the presence of NES is a finding that has been shown in other studies. The long-term follow-up studies are needed to investigate changes in depression, NES and eating patterns after bariatric surgery.* ***(Anatolian Journal of Psychiatry 2019; 20(6):605-612)***

Keywords: *morbid obesity, night eating syndrome, psychiatric comorbidity, self-esteem*

Morbid obezite hastalarında gece yeme davranışı ve psikiyatrik eş tanı

ÖZ

Amaç: *Gece yeme sendromu (GYS) ile obezite ilişkisi bir kısır döngüyü andırmaktadır. GYS varlığı obeziteye kaymayı kolaylaştırırken, obez bireylerde GYS daha sık görülmektedir. Literatürde morbid obezitesi olan bireylerde GYS'nin oranı %2-20 arasında bildirilmiştir. Obeziteye ek olarak GYS'nin de olması depresyon puanlarının daha yüksek, benlik saygısının daha düşük olması ile ilişkili bulunmuştur. Bu çalışmada morbid obezite hastalarında GYS yaygınlığı ve ilişkili etkenlerin araştırılması amaçlanmıştır.* ***Yöntem:*** *Bu çalışmada Bülent Ecevit Üniversite Hastanesi Psikiyatri Polikliniği'ne, morbid obezite cerrahisi öncesi psikiyatrik değerlendirme için başvuran 452 hasta değerlendirilmiştir. Psikiyatrik bozukluk varlığı bir psikiyatri uzmanı tarafından yapılan klinik görüşme ile değerlen-*

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dirildi. Sosyoekonomik ve klinik özellikler, yaş, cinsiyet, eğitim düzeyi, beden kitle indeksi kaydedildi. Beck Depresyon ve Beck Anksiyete Ölçekleri, Rosenberg Benlik Saygısı Ölçeği ve Gece Yeme Anketini doldurmaları istendi. ***Bulgular:*** *Dört yüz elli iki morbid obezite hastasının 59'unda (%13) GYS saptandı. GYS saptanan grupta BDÖ, BAÖ ve RBSÖ puanları GYS olmayan gruba göre anlamlı düzeyde daha yüksekti. GYS'li grupta, GYS olmayanlara göre psikiyatrik bozukluk (sırasıyla, %44.1 ve %26.2) ve depresyon (sırasıyla, %25.4 ve %13) oranı anlamlı olarak daha yüksekti. Morbid obezite örnekleminde sigara içmenin GYS görülme riskini 3.05 kat, BDÖ'deki 1 birimlik artışın GYS görülme riskini 1.05 kat artırdığı bulundu.* ***Tartışma:*** *Çalışmamızda morbid obezite hastalarında GYS eş tanısının psikiyatrik bozukluk, özellikle depresyon riskini artırdığı, bu hastalarda benlik saygısının daha kötü olduğu saptanmıştır. Sigaranın, GYS varlığı açısından en yüksek yordayıcı faktör bulunması başka çalışmalarda da gösterilmiş olan bir bulgudur. Bariyatrik cerrahi sonrası depresyon, GYS ve yeme paterni ile ilgili değişikliklerin tarandığı uzun süreli izleme çalışmalarına gereksinim vardır.* ***(Anadolu Psikiyatri Derg 2019; 20(6):605-612)***

Anahtar sözcükler: *Morbid obezite, gece yeme sendromu, psikiyatrik eş tanı, benlik saygısı*

INTRODUCTION

Night eating syndrome (NES) has been defined as a disorder characterized by excessive eating and insomnia at night and anorexia in the morning in the patients with obesity resistant to treatment by Stunkard in 1955.[1] Over the years it has been noticed that NES is not only in obese individuals, it is also seen in people with psychiatric disorders and even in normal population. In the studies; NES prevelance was reported to be 1-1.5% in the adult population,[2,3] while it was reported to be 12-35% in the psychiatry clinics,[4-9] and 6-42% in the obesity sample.[2,10,11]

The relationship between NES and the obesity resembles a vicious circle. The presence of NES facilitates the shift to obesity, whereas the NES is more common in obese individuals.[12,13] It is suggested that NES decreases the response rates to surgical obesity treatments and increases the risk of relapse.[14] In the literature, the frequency of NES is reported as 2-20% in individuals with morbid obesity.[15,16] In Turkey, the only study that investigated the eating disorders prior to bariatric surgery, the rate of NES was reported as 5.6%.[17]

The prevalence of the psychiatric disorders, especially depression and anxiety disorders, are more frequent and self-esteem is lower in the obese individuals seeking treatment.[11,13,14,16,18,19] In addition to obesity, the presence of NES was associated with higher depression scores and lower self-esteem.[14] It is speculated that the presence of the psychiatric disorder with obesity may increase the risk of NES by increasing maladaptive eating behaviors and by leading to impaired circadian rhythm.[13,14]

The aim of this study was to investigate the prevalence of the night eating syndrome and related factors in morbid obesity patients.

METHODS

Design and procedure

The sample of this study consisted of 470 patients who applied to Bülent Ecevit University Hospital Psychiatry Clinic for the psychiatric evaluation prior bariatric surgery. The patients with stage 2 (body mass index, BMI=35-39.9 kg/m^2) obesity who had at least one obesity-related comorbidity or Stage 3 (BMI≥40 kg/m^2) obesity were included in the study. The study was approved by the Bülent Ecevit University Ethics Committee of Clinical Research. Informed consent was obtained from participants prior to study participation. The presence of the psychiatric disorder was assessed by the clinical interview conducted by a psychiatrist. The sociodemographic and the clinical features such as age, gender, education level, height, and weight measurements, BMI were also recorded. Beck Depression Inventory and Beck Anxiety Inventory, Rosenberg Self Esteem Scale, and Night Eating Questionnaire were administered. In terms of this information, 18 cases with incomplete data were excluded, and a total of 452 patients were evaluated statistically.

Measures

The demographic characteristics: Four hundred and fifty-two patient were screened for demographic features such as age, gender, education level, marital status, and working status. Also, the information was obtained about; whether smoking and alcohol use, known physical and endocrine diseases, family history of the psychiatric disorder, family history of the obesity, laxative use, diet history, exercise history, the time spent on the screen, when the weight problem begins. In addition, BMI was calculated based on the height, and weight measurements.

Beck Depression Inventory (BDI): This is a

four-point Likert-type, self-report scale developed by Beck et al., which consists of 21 questions that evaluates the severity of depressive symptoms.[20] The total score is between 0 and 63. The Turkish adaptation of the BDI was done by Hisli.[21]

Beck Anxiety Inventory (BAI): BAI is a self-assessment scale consisting of 21 items developed by Beck et al.[22] The total score is evaluated over 63 points and high scores indicate increased anxiety. The validity and reliability study of the Turkish version was performed by Ulusoy et al.[23]

Night Eating Questionnaire (NEQ): Developed by Allison et al. the NEQ is designed as a Likert scale self-report measure to assess the presence and frequency of night eating behaviors.[24] The primary behaviors evaluated by the NEQ are: evening hyperphagia, nocturnal awakenings with ingestion of food, morning anoreksia, initial insomnia, and mood disturbances. The total score is between 0-52. In the original study, it was reported that the positive predictive value for the score of 25 and above was low (40.7%), and this value increased to 72.7% for the score of 30 and above. In the same study, the negative predictive value for NEQ was found to be high (95.2% and 94%, respectively) in both break points 25 and 30 points. In the validity and reliability study of the Turkish version of the questionnaire, when the value of 25 is accepted as the limit value in the NEQ score, it can be diagnosed as NES with 62% sensitivity and 96% selectivity.[25] In our study, as the positive predictive value was higher in the formation of the groups, the NEQ cut-off point was used as the 29/30 point limit.

Rosenberg Self-Esteem Scale (RSES): This scale used to measure self esteem was developed by M. Rosenberg.[26] The Turkish validity and reliability studies of the scale were performed by Çuhadaroğlu.[27] In our study, the self-esteem subscale, consisting of the first ten questions of the scale, was used to measure self-esteem. Five of these ten questions are positive and five are negative. The self-esteem subscale score ise between 0 and 6 points. The high total score indicates low self-esteem. According to the self-esteem subscale; 0-1 points are considered to have a high self esteem, 2-4 points in the moderate level, and 5-6 points in low self-esteem.

Statistical analysis

Statistical analysis was performed using SPSS 19.0 (SPSS Inc., Chicago, IL, USA) program. The continuous variables are given with mean, standart deviation, median, minimum and maximum values; the categorical variables are given with frequency and percent. Shapiro Wilk test used for test of normality. Mann Whitney U test for non-normal variables at two group comparisons. Pearson Chi-Square, Yates Correct Chi-Square and Fisher Exact Chi-Square tests are used where necessary for comparions of the categorical variables between the groups. Logistic regression analysis was performed to evaluate the effect of psychiatric diagnosis, presence of depression, smoking, laxative use, dieting, RSES, BDI, BAI variables on NES. The results were evaluated with a 95% confidence interval and $p<0.05$ was considered significant.

RESULTS

The mean age of the 452 patients who applied for the psychiatric evaluation prior the morbid obesity surgery was 39.5±10.7 (range: 18-67) and the mean BMI was 47.3±7.2 (range: 35.9-78.9). The data about the demographic characteristics and medical information of the patients are shown in Table 1. 70% of the patients were women, 72% were married, 49% were housewives or unemployed (Table 1). 60.8% of the patients had a family history of the obesity and 31.9% of them reported having a weight problem since childhood. The distribution of age, BMI and scale scores of the patients was shown in Table 2.

When the patients were divided into two groups with a cut-off score of 29/30 according to the Night Eating Questionnaire, the subjects who scored 30 points and more were considered to be Night Eating Syndrome. In our study, 59 (13%) patients with NES were detected. No significant difference was found between the groups with and without NES in terms of gender, marital status, education level, and working status ($p>0.05$, Table 1). There was no significant difference between the two groups with and without NES in terms of family history of the obesity, laxative use, dieting, exercise, BMI and the onset time of the weight problem ($p>0.05$, Table 1). The rate of smoking was found to be significantly higher in the NES group ($p<0.001$, Table 1). BDI, BAI and RSES scores were significantly higher in the group with NES than without NES (Table 2). In the group with NES, compared with non-NES; while the rate of the psychiatric disorder was significantly higher (respectively, 44.1% and 26.2%, $p=0.005$, Table 2),

Table 1. Comparison of demographical and physical characteristics of the NES and non-NES patients

		Non-NES NEQ≤29		NES NEQ≥30		Total (n=452)		
		n	%	n	%	n	%	p
Gender	Female	281	71.5	38	64.4	319	70.6	0.265
	Male	112	28.5	21	35.6	133	29.4	
Marital status	Married	285	72.5	41	69.5	326	72.1	0.807
	Single	94	23.9	15	25.4	109	24.1	
	Divorced-widow	14	3.6	3	5.1	17	3.8	
Education	Primary school	168	42.7	22	37.3	190	42.0	0.081
	High school	51	13.0	14	23.7	65	14.4	
	College	91	23.2	17	28.8	108	23.9	
	University	83	21.1	6	10.2	89	19.7	
Occupational status	Housewife-unemploy.	196	49.9	27	45.8	223	49.3	0.622
	Working	153	38.9	25	42.4	178	39.4	
	Retired	21	5.3	5	8.5	26	5.8	
	Student	23	5.9	2	3.4	25	5.5	
Smoking	No	230	58.5	22	37.3	252	55.8	<0.001*
	Quit	28	7.1	1	1.7	29	6.4	
	Yes	135	34.4	36	61.0	171	37.8	
Alcohol	No	340	86.5	51	86.4	391	86.5	0.950
	Quit	9	2.3	1	1.7	10	2.2	
	Yes	44	11.2	7	11.9	51	11.3	
Family history of obesity	No	154	39.2	23	39.0	177	39.2	0.976
	Yes	239	60.8	36	61.0	275	60.8	
Laxative use	No	351	89.3	53	89.8	404	89.4	0.904
	Yes	42	10.7	6	10.2	48	10.6	
Dieting history	No	116	29.5	21	35.6	137	30.3	0.344
	Yes	277	70.5	38	64.4	315	69.7	
Exercise history	No	202	51.4	27	45.8	229	50.7	0.657
	Reguler	73	18.6	11	18.6	84	18.6	
	Irreguler	118	30.0	21	35.6	139	30.8	
Time to start weight problem	Childhood	124	31.6	20	33.9	144	31.9	0.073
	Puberty	53	13.5	14	23.7	67	14.8	
	Adulthood	216	55.0	25	42.4	241	53.3	
Physical disease	No	215	54.7	41	69.5	256	56.6	0.046*
	Yes	178	45.3	18	30.5	196	43.4	
Hormonal disease	No	280	71.2	45	76.3	325	71.9	0.423
	Yes	113	28.8	14	23.7	127	28.1	

**: p<0.05; NES: Night Eating Syndrome; NEQ: Night Eating Questionnaire.*

whereas the rate of the physical disease was significantly lower (respectively, 30.5% and 45.3%, p=0.046, Table 1). There was no significant difference between the groups in terms of the endocrine disease (p>0.05, Table 1). The rate of depressive disorder was found to be significantly higher in the NES group (p=0.020, Table 2).

In the model established to examine the effect of psychiatric diagnosis, presence of depression, smoking, laxative use, dieting, RSES, BDI, and BAI variables to NES, smoking and BDI were found to be statistically significant (p values are <0.001 and 0.002, the explanatory rate of the model=17.9%).

According to this, the risk of developing NES in smokers increased by 3.05 fold; and a 1 unit increase in the BDI increases the risk of develop-

Table 2. Comparison of psychiatric characteristics of the NES and non-NES patients

		Non-NES n=393 NEQ≤29 Mean±SD(min-max)		NES n=59 NEQ≥30 Mean±SD(min-max)		Total n=452 (n=452) Mean±SD(min-max)		p
Age		39.7±10.9 (18-65)		37.8±1.2 (18-67)		39.5±10.8 (18-67)		0.180
Body Mass Index		47.5±7.6 (35.9-78.9)		45.9±4.2 (37.3-55.3)		47.3±7.2 (35.9-78.9)		0.716
Beck Depression Inventory		13.4±9.2 (0-43)		20.6±11.8 (0-47)		14.3±9.9 (0-47)		**0.001**
Beck Anxiety Inventory		10.8±9.9 (0-51)		16.2±13.7 (0-51)		11.5±10.7 (0-51)		**0.004**
Rosenberg Self-Esteem Scale		1.4±0.9 (0-5.1)		2.0±1.0 (0.4-4.3)		1.5±0.9 (0-5.1)		**<0.001**
		n	%	n	%	n	%	
Family history of mental disorders	No	358	91.1	49	83.1	407	90.0	0.091
	Yes	35	8.9	10	16.9	45	10.0	
Mental disorders	No	290	73.8	33	55.9	323	71.5	**0.005**
	Yes	103	26.2	26	44.1	129	28.5	
Suicid attempt	No	383	97.5	55	93.2	438	96.9	0.096
	Yes	10	2.5	4	6.8	14	3.1	
Depressive disorders		51	13.0	15	25.4	66	14.6	**0.020**
Anxiety disorder		30	7.6	5	8.5	35	7.7	0.795
Adjustment disorder		19	4.8	3	5.1	22	4.9	
Schizophrenia		1	0.3	2	3.4	3	0.7	
Obsessive compulsive disorder		1	0.3	1	0.3	2	0.4	
Alcohol addiction		1	0.3	0	0	1	0.3	

**: p<0.05; NES: Night Eating Syndrome; NEQ: Night Eating Questionnaire.*

ing NES by 1.05 fold.

While there was a weak positive correlation (r=0.185, p<0.001) between age and BMI, there was a weak negative (r=-0.127, p=0.007) correlation between age and RSES. There was a weak positive correlation between BMI and BDI (r=0.191, p<0.001), BAI (r=0.191, p<0.001) and RSES (r=0.140, p=0.003).

There was a moderate positive correlation between BDI and BAI scores (r=0.620, p<0.001). There was a moderate positive correlation between RSES score and BDI (r=0.547, p<0.001) and BAI (r=0.325, p<0.001).

DISCUSSION

In our study, the rate of the NES was found as 13% in the 452 person sample admitted to the hospital for bariatric surgery. This rate is higher compared to the ratio (5.6%) found in a previous study in a similar Turkish sample.[17] When the literature is evaluated, it is reported that the rates of NES in the morbid obesity sample are in the range of 8.9-40% and the most frequent problematic eating behavior is NES.[2,11,15,16,28-30]

In a meta-analysis of studies investigating the psychiatric disorders in the patients seeking bariatric surgery, 70-80% of the patients were female, and the mean age range was between 40 and 50 years and mean BMI was 45-50.[31] Similarly to the literature, 70% of the sample was female, the mean age was 39.4±10.7 and the mean BMI was 47.6±7.9 in our study.

The most common psychiatric disorders in the morbid obesity group are depression and anxiety disorder.[17,18,31] In our study, the rate of the patients with psychiatric disorders were 28.5% in all patients and the most common psychiatric disorder were depression (14.6%) and anxiety disorder (7.7%). Depression can lead to loss of energy and motivation, change of appetite and to indifference towards healthy lifestyle habits. According to the meta-analysis results, the relationship between depression and obesity is bi-directional.

In a meta-analysis by Dawes et al., the frequency of suicidal attempt and thought in the psychiatric evaluation prior to bariatric surgery was reported to be 9%.[31] In our study, the rate of attempted suicide was 3.1%. In our study, only suicide attempts were asked and suicidal thoughts were not asked. This may have caused the ratio to remain low compared to the literature.

In our study, 43.1% of 452 morbid obesity patients had physical health problems, and 28.1% had endocrine disease comorbidity. In contrast to the knowledge that NES is more common in the patients with diabetes mellitus and related to metabolic disorders,[16] in our study, the frequency of physical disease was lower in patients with NES compared to those without NES (p=0.046), and no significant difference was found in terms of endocrine disease frequency (p=0.423).

In the literature, it is reported that the prevalence of depression is higher in the patients with morbid obesity and NES comorbidity.[2,14,17,36] In addition to the higher prevalence of NES in the patients with depression, common symptoms of depression such as mood variability, sleep disturbance, and circadian rhythm deterioration are observed in NES.[24] In our study, the prevalence of the psychiatric disorder and depression, BDI, BAI and RSES scores were significantly higher in the obese patients with NES. This finding is consistent with the finding that the frequency of the psychiatric disorders, and especially depression was frequent and self-esteem was lower in the NES group in studies conducted with morbid obesity patients in the literature.[14,18,31]

In our morbid obesity sample, smoking and BDI scores were found to be determinants of the NES. In the study of psychiatric outpatient sample performed by Küçükgöncü et al. it was determined that smoking, depression and BMI were significant determinants of the NES.[37] In both studies, it is an interesting finding that smoking is the highest predictive factor for the presence of NES. It is reported that smoking is common in NES.[9,37,38] The prevalence of smoking in individuals with NES may be related to the common features of other oral addictive behaviors such as eating, binge eating, nail eating and alcohol use.

The fact that our study was performed as cross-sectional study, the diagnosis of psychiatric disorders was based on clinical interview, lack of clinical diagnosis of NES and NES diagnosis based on the NEQ and lack of control group can be counted among the limitations. On the other hand, the high number of samples, being second study in morbid obesity sample in Turkey which makes the study valuable.

Conclusion

In conclusion, in our study, it was found that comorbidity of NES in the morbid obesity patients increased the risk of the psychiatric disease, especially depression, and self-esteem was worse in these patients. It is widely accepted that it is important to screen the bariatric surgery patients from these aspects. The effect of the presence of NES on the results of the bariatric surgery is a controversial issue.[17,28] Also, There are reports of improvements in both depression and NES after bariatric surgery.[28] Although general medical evidence suggests that the psychiatric evaluation should be performed prior to bariatric surgery, the debate on whether many common disorders such as depression, NES and eating behavior disorders constitute definetive contraindications for surgery.[17,28,31]

According to the perspective of obese patients, bariatic surgery is like a magic wand that will get rid of both psychiatric problems and eating problems. In the light of all these, long-term follow-up studies are needed to investigate changes in depression, NES and eating patterns after the bariatric surgery. In addition, the nature of the relationship between depression and NES is a striking issue that needs to be examined.

Authors' contributions: *L.A.: research design, development of the methodology, data acquisition and statistical analysis, interpreted the patient data and drafted the manuscript; Ö.S.: development of the methodology, data acquisition and statistical analysis, interpreted the patient data and drafted the manuscript; V.Ç.K.: data acquisition; M.C.M.: data acquisition; N.A.: revised the manuscript critically. All authors read and approved the final manuscript.*

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