

Night Eating Syndrome Among Patients With Depression

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ABSTRACT

Objective: The purpose of this study was to identify the rate of night eating syndrome (NES) in a depressed population.

Method: The study sample was composed of 162 depressed patients and 172 healthy control participants.

Results: The rates of night eating in our sample with depression (35.2%) was higher as compared with healthy control participants (19.2%) ($p < .05$). In addition, in the depression group, the rate of NES-positive patients did not differ in accordance with body mass index (BMI) classification ($p > .05$). However, in the control group, the rate of NES-positive patients was significantly different with regard to BMI classification, and NES diagnosis was highest in the obese members of the control group ($p < .05$). Multiple logistic regression analysis was then used to evaluate the relationships of four variables – depression, gender, education status and BMI – with the diagnosis of NES. Results showed that significant independent predictors of NES were depression ($\beta = 2.64$; $p = .001$; 95% confidence interval = 1.52-4.57); male gender ($\beta = 2.34$; $p = .002$, 95% confidence interval = 1.37-4.03); and a BMI of 25 or greater ($\beta = 1.83$; $p = .022$; 95% confidence interval = 1.09-3.08).

Discussion: This is the first study to find that depressed patients are at a significantly greater risk for NES. Depression, male gender and BMI may account for the high rate of NES found in this population.

BACKGROUND

Night eating syndrome (NES) is emerging as a potential candidate for a new eating disorder diagnosis. It was first described in 1955 by Stunkard and colleagues (1) in obese outpatients, but it was largely neglected for 30 years. However, interest in NES has slowly reemerged. Night eating syndrome is characterized by a delay in the circadian pattern of food intake that is manifested by evening hyperphagia (i.e., the consumption of $\geq 25\%$ of the total daily food intake after the evening meal) and nocturnal awakenings accompanied by the ingestion of food (2). The defining features of NES have been identified as evening hyperphagia, morning anorexia, and sleep disturbance (3).

Despite recent advances, the field has lacked a standardized research diagnostic criteria set. On April 26, 2008, the First International Night Eating Symposium was held at the University of Minnesota in Minneapolis; the goals of this symposium were to share research findings among eating and sleep disorder experts and to develop research diagnostic criteria for NES (4). These aims were accomplished, and the proposed criteria have recently been peer reviewed and published.

Proposed research diagnostic criteria for NES (4)

The First International Night Eating Symposium brought together expert investigators in this area, who reached a consensus regarding a set of provisional diagnostic criteria for the condition:

A. The daily pattern of eating demonstrates a significantly increased intake in the evening and/or nighttime, as manifested by one or both of the following:

1. At least 25% of food intake is consumed after the evening meal
 2. At least two episodes of nocturnal eating occur per week.
- B. Awareness and recall of evening and nocturnal eating episodes are present.
- C. The clinical picture is characterized by at least three of the following features:
1. Lack of desire to eat in the morning and/or breakfast is omitted on four or more mornings per week
 2. Presence of a strong urge to eat between dinner and sleep onset and/or during the night
 3. Sleep onset and/or sleep maintenance insomnia are present four or more nights per week
 4. Presence of a belief that one must eat to initiate or return to sleep
 5. Mood is frequently depressed and/or mood worsens in the evening.
- D. The disorder is associated with significant distress and/or impairment in functioning.
- E. The disordered pattern of eating has been maintained for at least 3 months.
- F. The disorder is not secondary to substance abuse or dependence, a medical disorder, a medication, or another psychiatric disorder.

Night eating syndrome was first noted among obese patients. The association between NES and obesity has also been supported, with rate estimates suggesting that NES is more common among obese persons (6%-16%) (5, 6) compared to the general population (1.5%) (7). Despite the elevated incidence that is found among obese sample individuals, not all persons with NES are obese or overweight (8-11). Additionally, the original description of NES noted that psychosocial stressors were common and closely coincided with exacerbations of night eating (12). Furthermore, NES is common among patients with mental illness. Night eating syndrome is prevalent among psychiatric clinic outpatients, within this group 12.3% met the criteria for NES (13). This rate is significantly higher than the rate of NES in the general population (1.5%) (7), and it is similar to the rate of NES among obese sample individuals (6%-16%) (6, 14). Depressed mood has also been linked to NES in several studies (2, 8, 9, 15). For example, Birketvedt et al. (8) studied the behavioral and neuroendocrine characteristics of NES and participants with NES had mood scores that were lower compared to those of obese controls. The mood scores were shown on visual analog scales. Interestingly, there was

a circadian decline in mood scores after 4 p.m. for NES subjects, which is opposite to the pattern observed with melancholic depression in which mood improves across the day (8). Moreover, among obese patients, the participants with NES have higher depression scores on the Zung Depression Inventory and lower self-esteem ratings on the Rosenberg Self-Esteem Scale (15). The serotonin system may be active in the pathophysiology of NES, as shown by single photon emission computed tomography has shown significant elevation of serotonin transporters in the midbrain of night eaters (16). Elevations in serotonin transporter levels lead to decreased postsynaptic serotonin transmission and should impair circadian rhythms and satiety. These deficits suggest that improvement in serotonin function should alleviate night eating syndrome, therapeutic response of NES to sertraline (17-19) and to other selective serotonin reuptake inhibitors (20). Topiramate, which enhances GABA, was found to be effective in two cases (21). Controlled clinical trials are needed before determining the safety and efficacy of topiramate in NES.

Symptoms of depression have been more frequent among individuals with NES and the rate of NES in a population seeking treatment for psychiatric disorders is of interest. However, as there is presently no study regarding the rate of NES in depressive patients, this descriptive study was conducted to fill that research gap.

METHODS

PARTICIPANTS

The study sample was comprised of 162 depressed patients and 172 healthy control participants who were consecutively recruited from the outpatient clinics of the Departments of Psychiatry and of Family Medicine by the Faculty of Medicine at Kahramanmaraş Sutcuimam University in Turkey.

Depressed patients

The diagnosis of depression was made in accordance with the Diagnostic and Statistical Manual of Mental Disorders, fourth edition, classification system using the Turkish version of the Structured Clinical Interview for Diagnostic and Statistical Manual of Mental Disorders, fourth edition, Axis I Diagnosis–Clinician Version (22). The interview was performed by a psychiatrist (Ö.A.), and it was used to determine whether patients had a lifetime diagnosis of major depression. One hundred and sixty-two patients with major depressive disorders (single episode

or recurrent) were recruited from the outpatient clinic of the Department of Psychiatry. Patients were excluded if they had a comorbid psychiatric diagnosis, a history of neurological illness, or any major medical disorders. In addition, and on the basis of self-report, patients with a current issue or a previous diagnosis involving psychoactive substance abuse were excluded from participation.

Control participants

Control participants were recruited from among the healthy participants who applied for a yearly checkup at the university's family medicine outpatient clinic. One hundred and seventy-two control participants (including no current or past psychiatric disorder or treatment) were enrolled in the study. They were interviewed, and they were excluded if there was any evidence of psychiatric history, neurological history, or psychoactive substance abuse. The control group was selected to match the depressed patients as closely as possible in the areas of age and body mass index (BMI). The diagnosis of NES was made in accordance with the proposed research diagnostic criteria for NES. These criteria are listed above (4).

ETHICAL CONSIDERATIONS

The written informed consent was obtained from the depressed patients and the control individuals before enrollment. This study was approved by the ethics committee of the Faculty of Medicine of Kahramanmaraş Sutcuimam University.

PROCEDURES

The demographic questionnaire obtained information about each participant's age, gender, marital status, education, and occupation. Height and body weight were measured by a medical examiner. The height and weight were recorded with participants wearing light clothing and with their shoes removed. Body Mass Index (BMI) was calculated as the weight in kilograms divided by the height in meters squared. Obesity was defined as a BMI of ≥ 30 kg/m². Participants with BMIs between 25 kg/m² and 29.9 kg/m² were accepted as overweight, and participants with BMIs of less than 25 kg/m² were accepted as being of normal weight.

STATISTICAL AND DATA ANALYSES

For the comparison of continuous variables, Student's t-test was used. The values were presented as the mean \pm the standard deviation (SD) and as percentages. For proportion comparison between the groups, the chi-

square test and Fisher's exact test were used. Multiple linear regression analysis was performed to identify factors that were independently associated with NES. The odds ratios and the 95% confidence intervals (CIs) were calculated, and a *P* value of $< .05$ was considered as statistically significant. Data were computerized with the use of the Statistical Packages for the Social Sciences software (SPSS v.15.0; SPSS Inc., Chicago, IL, USA).

RESULTS

No significant differences were found between the depressed group and the control group in terms of age (mean = 35.03 and 35.87, respectively; SD = 13.21 and 11.49, respectively; $p > .05$) and BMI (mean = 25.94 and 24.99 kg/m², respectively; SD = 4.93 and 4.72, respectively; $p > .05$). However, there was significant difference between the two groups in terms of gender, education and occupation ($p < .05$). Of the enrolled participants, 63.8% ($n = 213$) are women; 68.3% ($n = 228$) are married; and 49.4% ($n = 165$) had a high-school education or more. Participants' BMIs ranged from 16.53 kg/m² to 39.06 kg/m² (mean = 25.45; SD = 4.84). The demographic characteristics of the patient and control groups are presented in Table 1.

Table 1. Sociodemographic variables of the depressed and control groups

Sociodemographic variables	Depressed group (n = 162)	Control group (n = 172)	<i>p</i> value
Gender			
Women	117 (72.2%)	96 (55.8%)	0.002
Men	45 (27.8%)	76 (44.2%)	
Marital status			
Married	117 (72.2%)	111 (64.5%)	0.182
Single	42 (25.9%)	53 (30.8%)	
Divorced or widowed	3 (1.9%)	8 (4.7%)	
Occupation			
White collar worker	10 (6.2%)	54 (31.4%)	<0.001
Laborer	12 (7.4%)	23 (13.4%)	
Housewife	95 (58.6%)	48 (27.9%)	
Unemployed	5 (3.1%)	17 (9.9%)	
Retired	11 (6.8%)	12 (7.0%)	
Self-employed	10 (6.2%)	13 (7.6%)	
Student	19 (11.7%)	5 (2.9%)	
Education			
Secondary school or less	109 (67.3%)	60 (34.9)	<0.001
Beyond secondary school	53 (32.7%)	112 (65.1)	
BMI (kg/m²)			
Normal	74 (45.7%)	95 (55.2%)	0.168
Overweight	53 (32.7%)	49 (28.5%)	
Obese	35 (21.6%)	27 (15.7%)	
Age (years)	35.03 \pm 13.21	35.87 \pm 11.49	0.535

When the patients who met the criteria for NES (n = 90) were compared by t-testing with those who did not meet the criteria for NES with regard to gender, marital status, education, and occupation, no statistically significant differences were found (p > .05) except in the area of gender (p < .05) between two groups. Men were much more likely to be night eaters than women (Table 2).

The rate of NES-positive patients in the depressed group (n = 57; 35.2%) was significantly higher than the rate of NES-positive patients in the control group (n = 33; 19.2%; p = .001). In the depressed group, the rate of patients who met the criteria for NES (n = 90) was not different on the basis of BMI classification (p > .05). In the control group, though, the rate of NES-positive patients was significantly different according to BMI classification. NES diagnosis was highest among the obese members of the control group (p < .05; Table 3).

Table 2. Descriptive findings for participants with and without NES

	NES-positive individuals (n = 90)	NES-negative individuals (n = 244)	p value
Gender			
Women	48 (22.5%)	165 (77.5%)	0.016
Men	42 (34.7%)	79 (65.3%)	
Marital status			
Married	63 (27.6%)	165 (72.4%)	0.909
Single	24 (25.3%)	71 (74.7%)	
Divorced or widowed	3 (27.3%)	8 (72.7%)	
Education			
Secondary school or less	49 (29%)	120 (71%)	0.393
Beyond secondary school	41 (24.8%)	124 (75.2%)	
Occupation			
White collar worker	17 (26.6%)	47 (73.4%)	0.585
Laborer	8 (22.9%)	27 (77.1%)	
Housewife	35 (24.5%)	108 (75.5%)	
Unemployed	7 (31.8%)	15 (68.2%)	
Retired	8 (34.8%)	15 (65.2%)	
Self-employed	5 (21.7%)	18 (78.3%)	
Student	10 (41.7%)	14 (58.3%)	
Total	90	244	

Table 3. Comparison of the rates of NES-positive individuals and NES-negative individuals according to the classification of weight in the depressed and control groups

Groups	NES-positive individuals (n = 90)	NES-negative individuals (n = 244)	p value
Depression			
Normal	27 (36.5%)	47 (63.5%)	0.645
Overweight	20 (37.7%)	33 (62.3%)	
Obese	10 (28.6%)	25 (71.4%)	
Control			
Normal	9 (9.5%)	86 (90.5%)	0.001
Overweight	14 (28.6%)	35 (71.4%)	
Obese	10 (37.0%)	17 (63.0%)	

Multiple logistic regression analysis was then used to evaluate the relationships of four variables – depression, gender, education status and BMI – with the diagnosis of NES. The results demonstrated that significant independent predictors of NES were depression ($\beta = 2.64$, p = .001, 95% CI = 1.52-4.57); male gender ($\beta = 2.34$, p = .002, 95% CI = 1.37-4.03); and a BMI of at least 25 ($\beta = 1.83$, p = .022, 95% CI = 1.09-3.08). These results are summarized in Table 4. The depressed patients (n = 162) were 2.64 times more likely (Wald = 12.00; p = .001) to meet the criteria for NES than the members of the healthy control group. Overweight and obese participants (i.e., those with a BMI of ≥ 25 kg/m²) were 1.83 times more likely (Wald = 5.25; p = .022) to meet the criteria for NES than were participants of normal weight.

DISCUSSION

This study assessed NES among a particularly vulnerable group: depressed patients. Within this group, 35.2% met the criteria for NES. Night eating syndrome has been linked with psychiatric comorbidity in several studies. However, depression rates in NES patients were searched in the previous studies and the symptoms and diagnosis of depression have generally been more frequent among individuals with NES (8, 15, 23). In a descriptive study of NES, de Zwaan and colleagues (9) found that 56% of patients had a lifetime history of major depressive disorder, which was likely higher than the rate seen among the healthy control group. Lifetime rates of 17.5% for generalized anxiety disorder and of 18% for posttraumatic stress disorder were reported in that study (9). Lundgren and colleagues (24) reported that 52% of nonobese night eaters met lifetime criteria

Table 4. Multiple logistic regression analysis of the independent variables affecting the NES diagnosis.

Factors	Odds Ratio	% 95 Confidence Interval	p value
Group			
Control	1.00		0.001
Depression	2.64	1.52-4.57	
Gender			
Women	1.00		0.002
Men	2.34	1.37-4.03	
Education			
Secondary school or less	1.00		0.889
Beyond secondary school	0.96	0.55-1.67	
BMI			
≤ 24	1.00		0.022
≥ 25	1.83	1.09-3.08	

for unipolar mood disorders and that 47% met lifetime criteria for anxiety disorders; both of these rates were significantly higher than the lifetime rates of these same disorders among nonobese control participants. In the current study, the rate of NES (35.2%) is higher than that which has been reported among general psychiatric samples of all BMIs (12.3%) (13) and among obese individuals with severe mental illness (25%) (25). Caution should be used, though, when comparing the current findings to those of previous studies because of the various criteria that have been used to diagnose NES in those previous studies. Several factors may explain the high rate of NES in the current sample, including stress, sleep disturbance, and the properties of patients' medications. Night eating syndrome has long been associated with stress and psychological comorbidity (12, 15, 24, 26). The relationship between depressive symptoms and sleep complaints has been described previously. The sleep of individuals with depression is often disturbed, which may increase the likelihood of the nocturnal ingestion of food. It is also well documented that psychotropic medications (particularly antidepressants) affect hunger and satiety, which could put an individual at increased risk for NES. It is quite plausible that these factors interact to put an individual at an even greater risk than a member of a nonpsychiatric population.

When the parameters that correlated with NES were evaluated with the use of multivariate analysis, the presence of depression and male gender were the strongest predictors of NES, followed by the individual being overweight or obese.

Data regarding the relationship between gender and NES are limited. The original night eaters in the studies by Stunkard and colleagues (12) and Greeno and colleagues (27) were women. Two studies have reported NES to be more common among men than among women (28, 29), whereas all others have not demonstrated any gender differences. The current findings were similar to those of Aronoff and colleagues (28): men were more likely to have NES, which implicates maleness as a risk factor for NES.

The degree of BMI was also found to be a risk factor for NES. However, night eating was not associated with BMI in the depressed group of our study sample, but it was associated with BMI in the control group. Reviews frequently note that obesity or higher BMI is a common clinical correlate of NES and an indicator of the clinical significance of the syndrome (30). In studies that have compared NES with non-NES obese participants, BMI

was greater in the NES group in only one study. Body Mass Index was not found to be significantly different between NES and non-NES obese participants in the remaining studies when this was reported (6, 14, 15, 31-33). The study by Colles and colleagues (26) ($n = 431$) showed a significant increase in NES rate across five BMI categories from 18 kg/m² to 22 kg/m² and up through 40 kg/m² ($\chi^2 = 22.7$; $P < .001$). The previously mentioned study by Aronoff and colleagues (28) also showed a strong relationship between overweight status and NES ($\chi^2 = 7.1$; $P = .008$). Lundgren and colleagues (13) reported that, although their sample was, on average, overweight (mean BMI = 29.1 kg/m²), obese psychiatric patients (i.e., those with a BMI of ≥ 30 kg/m²) were five times more likely to meet the criteria for NES than nonobese psychiatric patients (i.e., those with a BMI of 18.5 kg/m²-25.9 kg/m²). Future studies are needed to examine prospective changes in weight among depressed individuals with NES of all weight ranges.

LIMITATIONS

The primary limitation to be considered is the definition of NES. As noted previously, no established DSM-IV criteria for the symptoms of NES exist and only provisional criteria have been established. A lack of consistent definitions complicates the comparisons between studies. Another limitation to be considered is that no assessment of depression severity and anxiety was made in our study. Further, the sample was small and unfortunately there was significant difference between depression and control group in the context of gender, education and occupation. Therefore, these findings warrant replication with matched large samples and assessment of depression type (melancholic vs atypical) one may expect there to be a significant difference since hyperphagia is a criterion in atypical depression.

In spite of the limitations discussed above, the strengths of this study are that the rate and classification of NES in this sample were not based solely on two behaviors (i.e., Evening hyperphagia or Nocturnal ingestions) but rather on the recently proposed research diagnostic criteria (4).

In summary, this is the first study to assess the rate of NES among individuals with depression in Turkey. The rate of night eating in our sample with depression (35.2%) was higher as compared with previous studies that involved psychiatric patients. Arguably, night eating syndrome may simply be part of the depression and may

disappear if depression is resolved. Overall, discrepancies in NES rates also may be attributable to the varying diagnostic criteria sets used in different studies of NES. This study also suggests that depression, male gender, and BMI are risk factors for NES. Future studies are needed to replicate these findings, to understand why this population is at increased risk for NES, and to determine the effects of NES on health outcomes among individuals with depression. It is recommended that patients with depression be screened for symptoms of night eating (e.g., evening hyperphagia, nocturnal eating).

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