

The Prevalence of Night Eating Syndrome among Outpatient Overweight or Obese Individuals with Serious Mental Illness



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SUMMARY

Objective: This study aimed to determine the prevalence of Night Eating Syndrome (NES) among overweight or obese patients with serious mental illness and its relationship with insomnia and quality of life.

Methods: This study included 158 overweight or obese patients diagnosed with schizophrenia, schizoaffective disorder, and bipolar disorder (according to DSM-IV criteria) that were not in the active disease period. A clinical interview and Night Eating Questionnaire (NEQ) were used to assess the prevalence of NES among those in the study group. Body mass index (BMI), sleep quality, and quality of life measures were also evaluated for each patient.

Results: Twelve patients (7.6%) were diagnosed with NES via clinical interview while 26 (16.5%) were diagnosed by having ≥ 25 points in the NEQ. There were no statistically significant differences between the NES and non-NES groups with respect to age, gender, education and body mass index. However, quality of life scores were lower while the severity of insomnia scores were higher in patients with NES.

Conclusion: The prevalence of NES is higher among overweight or obese patients with serious mental illness when compared to prevalence data in a general population, as demonstrated by previously published studies. Night eating behavior may be related to insomnia and poor quality of life measures. The recognition of NES among patients with severe mental disease is essential to promote prevention of obesity and insomnia as related to night eating behavior.

Keywords: Eating disorders; sleep; obesity

INTRODUCTION

The National Institute of Mental Health has defined serious mental illness as any mood disorder or schizophrenia spectrum disorder that has led to impaired functioning for at least 2 years (Lundgren et al., 2010). Individuals with severe mental illness are at greater risk of being overweight than the normal population (Dickerson et al., 2006). Although it is not fully understood why those with severe mental illness are more prone to being overweight, it is thought to be associated with factors such as physiological changes in hunger and

satiety, drug-related metabolic changes, and a sedentary life style (Lundgren et al. 2010). It has been hypothesized that there is a closer association with night eating and obesity in individuals with severe mental illness compared to those without. Night eating may frequently contribute to excess weight among individuals with severe mental illness (Lundgren et al. 2010).

In 1955, Stunkard first described night eating syndrome (NES) in patients with treatment-resistant obesity (Stunkard et al. 1955). NES is defined as a specific disorder with a

Received: 09.05.2015 - Accepted: 08.07.2015

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delayed eating pattern in which the majority of the daily calorie requirement is consumed during the evening and overnight (Palmese et al. 2013). Following the first description of NES, various diagnostic criteria have been used, with those employed by Stunkard (1955) and Birkedvedt (1999) being the most common. In order to establish diagnostic consistency, diagnostic criteria for NES were proposed by the International Night Eating Syndrome Study Group (Atasoy et al., 2014). NES was first defined in the fifth edition of the Diagnostic and Statistical Manual of Mental Disorders (DSM-V) as a feeding and eating disorder not classified elsewhere (American Psychiatric Association, 2013).

Although NES was first observed in patients with obesity, it has also been reported in non-obese subjects (Marshall et al. 2004). It is difficult to determine the exact prevalence of NES as different diagnostic criteria have been used in published studies. However, the prevalence in the general population is estimated to be 1.5%, and between 6% and 16% in individuals with obesity (Lundgren et al. 2006, Stunkard et al. 1996, Cerú-Björk et al. 2001). The prevalence of NES among psychiatric patients treated on an outpatient basis is reported to be 12-22%, is 25% in overweight or obese individuals with severe mental illness, and is 12% in patients with obesity who have also been diagnosed with schizophrenia or schizoaffective disorder (Lundgren et al. 2006, 2010, Palmese et al. 2013, Saraçlı et al. 2015).

Sleeping and eating behaviors in obese individuals diagnosed with NES have generally been investigated as separate entities; studies often do not consider the relationship between them. Published studies have reported that the effects of obesity and NES compromise quality of sleep (Palmese et al. 2011, Cleator et al. 2013).

The prevalence of NES in overweight or obese patient groups with severe mental illness in Turkey is not yet known. Therefore, this study aimed to determine the prevalence of NES in this specific population and to investigate the impact of NES on quality of sleep and quality of life, and its relationship with body mass index (BMI).

MATERIALS and METHODS

One hundred fifty-eight patients who were overweight or obese, diagnosed with schizophrenia or schizoaffective bipolar disorder (using Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I)), and who were referred to Karadeniz Technical University (KTU) Farabi Hospital Psychiatry outpatient clinic between February 2014 and December 2014 were included in this study. We did not restrict this study to a single psychiatric disease group since patients diagnosed with schizophrenia, schizoaffective disorder, and bipolar disorder have similar predisposing factors in terms of obesity. Enrollment criteria included patients aged 18-65 who were overweight or obese, literate, and capable of

sufficient verbal communication skills in the applied scales. The overweight group included subjects with BMIs between 25 and 29 and the obesity group included those with BMIs of 30 or above. Subjects were excluded from the study if they had mental retardation, severe physical disease, if they were unable to understand the applied scales, refused to participate, were working shifts or if they had BMIs less than 25. Informed consent forms were obtained from patients who agreed to participate. The study began following approval from the KTU Faculty of Medicine Clinical Research Ethical Committee (permission no. 2013/140).

Sociodemographic Data Form: Various sociodemographic characteristics (such as age, sex and marital status) were recorded in this form, which was drawn up by the authors.

Structured Clinical Interview for DSM-IV Axis I Disorders (SCID-I): This structured interview tool was developed by First et al. (1997) to diagnose Axis I disorders according to DSM-IV criteria. The scale allows for diagnostic evaluations to be performed in a standard manner, making diagnoses more reliable and permitting a more systematic investigation of symptoms. The scale has been translated into Turkish, and its validity and reliability have been established (Özkürkçügil et al. 1999).

Night Eating Questionnaire (NEQ): Developed by Allison et al. (2008), this self-report questionnaire consists of 14 questions and measures the incidence and presence of night eating behavior. The questionnaire contains questions concerning morning appetite, the first food intake of the day, evening and night eating, level of food intake after the evening meal, food cravings during pregnancy, control over night eating behavior, difficulty falling asleep, incidence of waking at night, and awareness and mood during night eating. The total possible score ranges between 0 and 52. An NES cutoff point of 25 is recommended for screening research (Allison et al. 2008). The reliability and validity of the Turkish-language version were established by Atasoy et al. (2014).

Insomnia Severity Index (ISI): This scale was developed to assess the severity of insomnia symptoms and can also be used in the clinical evaluation of insomnia in the normal population (Bastien et al. 2001). The index consists of 7 items, each of which is scored between 0 and 4 on a 5-point Likert-type scale. The total possible score ranges between 0 and 28. Scores of 0-7 indicate clinically insignificant insomnia, scores of 8-14 indicate the insomnia subthreshold, scores of 15-21 are indicative of clinical insomnia (moderate), and scores of 22-28 reflect clinical insomnia (severe). The validity and reliability of the Turkish-language version were established by Boysan et al. (2010).

Pittsburgh Sleep Quality Index (PSQI): This scale was developed by Buysse et al., and the validity and reliability of the Turkish-language version were investigated by Ağargün et al. (1996). The PSQI is a self-report scale consisting of 19 items that are used to assess the quality of sleep and sleep

disturbances over the preceding month. The scale consists of 7 subscales that evaluate the subjective quality of sleep, sleep latency, duration of sleep, habitual sleep efficiency, sleep disturbances, the use of sleep medications and loss of daytime functioning. Each item is equally scored between 0 and 3. A total PSQI score is obtained by adding the subscale scores, giving a total score ranging between 0 and 21. Total PSQI scores of 5 or more indicate poor quality of sleep.

Beck Depression Inventory (BDI): Developed by Beck et al. (1961), this self-report scale consists of 21 questions that are used to assess the severity of depressive symptoms. Each question is scored between 0 and 4, and total scores range between 0 and 63. A cutoff score of 17 was determined for the version adapted into Turkish by Hisli (1988).

Positive and Negative Syndrome Scale (PANSS): Developed by Kay et al. (1987), this 30-item semi-structured scale is used for the psychopathological measurement of positive (PANSS-P), negative (PANSS-N) and general (PANSS-G) schizophrenia symptoms. There are 7 items in the positive syndrome subscale, 7 in the negative syndrome subscale, and the remaining 16 are in the general psychopathology subscale. Each item is scored between 1 and 7, depending on the severity of the symptom. The validity and reliability of the Turkish-language version were investigated by Kostakoğlu et al. (1999).

Young Mania Rating Scale (YMRS): Developed by Young et al. (1978), this scale is used to measure changes in and the severity of manic episodes. It consists of 11 items, each of which is used to investigate 5 degrees of severity, and it is assessed by the administrator. Seven items are 5-point Likert type, and the other 4 are 4-point Likert type. Total YMRS scores range between 0 and 60. The validity and reliability of the Turkish-language version of this form were established by Karadağ et al. (2001).

Quality of Life Enjoyment and Satisfaction Questionnaire (Q-LES-Q): This self-report questionnaire was developed by Andicott et al. (1993) and is used to measure quality of life. High scores indicate high enjoyment and satisfaction of life. The validity and reliability of the Turkish-language version was performed by Özer et al. (2001); however, no psychometric data were provided. The general evaluation section of the scale, which was used in the current study, has also been used in some other studies in Turkey.

After participants were informed about the study, their written informed consent forms were obtained and their sociodemographic characteristics were recorded. All participants were administered the SCID-I, PANSS and YMRS, in that order, by the psychiatrist conducting the interview. In addition, the diagnosis of NES was clinically assessed by the psychiatrist on the basis of new diagnostic criteria recommended by the International Night Eating Syndrome Study Group. NEQ, ISI, PSQI, BDI and quality of life scales were completed by the participant. In addition, participants were weighed and measured using electric scales, while wearing light clothing

and barefoot, by the psychiatrist conducting the interview. BMI was obtained by dividing body weight (in kg) by height squared (in m²). Participants were grouped as overweight if their BMI was 25-29, and obese if their BMI was 30 or above.

Statistical Analysis

The Kolmogorov-Smirnov test was used to determine the normal distribution of the data. Student's t test was used to compare normally distributed measurement data between two groups, and the Mann Whitney U test was used for non-normally distributed data. The chi square test was used to compare qualitative data. Data obtained by measurement were expressed as arithmetic mean $\pm$ standard deviation, and data obtained by counting were expressed as percentages (%). Values of p less than 0.05 were considered statistically significant.

RESULTS

The sociodemographic data of the participants are shown in Table 1. Sixty-nine patients (43.7%) were female and 89

Table 1. Demographic and clinical characteristics of the study group

Participants' characteristics	Total sample (n=158)
Age (Mean $\pm$ SD)	39.73 $\pm$ 10.27
Gender- % (n)	
Female	43.7% (69)
Male	56.3% (89)
Education (years) (Mean $\pm$ SD)	9.38 $\pm$ 3.68
Marital status - % (n)	
Married	41.1% (65)
Single	48.7% (77)
Divorced	6.3% (10)
Windowed	1.9% (3)
BMI (Mean $\pm$ SD)	31.07 $\pm$ 4.66
BMI classifications - % (n)	
Overweight	41.4% (58)
Obese	58.6% (82)
Psychiatric diagnosis- % (n)	
Schizophrenia	43% (68)
Bipolar disorder	49.4% (78)
Schizoaffective disorder	7.6% (12)
PANSS	
General (Mean $\pm$ SD)	19.45 $\pm$ 4.39
Positive (Mean $\pm$ SD)	8.95 $\pm$ 2.86
Negative (Mean $\pm$ SD)	10.76 $\pm$ 4.97
BDI (Mean $\pm$ SD)	4.63 $\pm$ 4.63
ISI (Mean $\pm$ SD)	4.41 $\pm$ 3.74
PSQ (Mean $\pm$ SD)	3.92 $\pm$ 3.08
Q-LES-Q (Mean $\pm$ SD)	49.46 $\pm$ 6.68
NEQ (Mean $\pm$ SD)	15.46 $\pm$ 8.55
NES- % (n)	7.6 (12)

BMI: Body Mass Index; PANSS: Positive and Negative Syndrome Scale; BDI: Beck Depression Inventory; ISI: Insomnia Severity Index; PSQI: Pittsburgh Sleep Quality Index;

Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire; NEQ: Night Eating Questionnaire; NES: Night Eating Syndrome

(56.3%) were male, with a mean age of 39.73 ± 10.27 years. The mean length of education was 9.38 ± 3.68 years. Fifty-eight patients (41.4%) were overweight and 82 (58.6%) were obese. The mean BMI was 31.07 ± 4.66 . 43% (n=68) of subjects were diagnosed with schizophrenia, 49.4% (n=78) were diagnosed with bipolar disorder, and 7.6% (n=12) were diagnosed with schizoaffective disorder. The mean BDI score for the entire study group was 4.63 ± 4.63 . The mean PANSS scores of patients with schizophrenia or schizoaffective disorder were as follows: PANSS-G: 19.45 ± 4.39 , PANSS-P: 8.95 ± 2.86 and PANSS-N: 10.76 ± 4.97 .

NES was diagnosed through clinical interview in 7.6% (n=12) of the patients. Total NEQ scores ranged between 3 and 41 (mean 15.46 ± 8.55), and 16.5% (n=26) of patients had NEQ scores of 25 or above. Sensitivity and specificity were calculated for the NEQ, a self-report scale. With 25 used as a cutoff point, NES was diagnosed with 83.33% sensitivity and 89.04% specificity.

The mean ISI score was 4.41 ± 3.74 ; 15.8% (n=25) of patients had subthreshold insomnia and 2.5% (n=4) had moderate insomnia. The mean PSQI score for the entire group was 3.92 ± 3.08 , with quality of sleep being assessed as poor in 37.3% (n=59) of patients. Significant differences were determined between the NES group and the non-NES group in terms of mean PSQI and ISI scores ($p=0.01$, $p=0.01$, respectively) (Table 2).

The mean total quality of life scale score for the entire group was 49.46 ± 6.68 (Table 2). A significant difference was determined between the NES and non-NES groups in terms of mean Q-LES-Q scores ($p=0.01$).

The mean BDI score among all of the participants was 4.63 ± 4.63 , and there was no significant difference between the NES- and non-NES groups in terms of mean BDI scores. Further, there was no difference between the two groups in terms of BMI.

A statistically significant difference was observed between the NES and non-NES groups in terms of mean NEQ scores ($p=0.000$).

Schizophrenia spectrum was diagnosed in 50.6% (n=80) of the patients and bipolar disorder was diagnosed in 49.4% (n=78). No significant difference was determined between the NES and non-NES groups in terms of incidence.

Of the patients in this study, 49.4% (n=78) smoked and 5.7% used alcohol or substances; 32.9% (n=52) were using antipsychotics only, 7.6% (n=12) were using mood regulators only, 47.5% (n=75) were using both antipsychotics and mood regulators, 2.5% (n=4) were using antipsychotics, mood regulators and antidepressants, and 9.5% (n=15) were on antipsychotics with antidepressants. All of the antipsychotics used by the patients were atypical.

Table 2. Comparison of characteristics and test scores of participants with and without NES

	NES (+)			NES (-)		x ² df	p
	n=12			n=146			
	n	%	n	%			
Gender							
Male	5	41.7	84	57.5	0.58	1	0.446
Female	7	58.3	62	42.5			
Psychiatric diagnosis							
Schizophrenia spectrum disorder	4	33.3	76	51.1	0.90	1	0.344
Bipolar disorder	8	66.7	70	47.9			
Tobacco Use	6	50	72	49.3	0.00	1	1.000
	Mean	SD	Mean	SD	Mann-Whitney U	p	
Q-LES-Q	44.17	9.31	49.90	6.26	487.0.	0.009	
PSQI	6.17	2.08.	3.73	3.08	376.5	0.002	
ISI	7.17	2.62	4.18	3.73	384.0	0.001	
BDI	3.42	3.65	4.72	5.07	713.0	0.329	
NEQ	29.75	9.83	14.28	7.31	217.5	0.000	
BMI	31.96	6.27	31.13	5.16	708.0	0.270	

Q-LES-Q: Quality of Life Enjoyment and Satisfaction Questionnaire; PSQI: Pittsburgh Sleep Quality Index; ISI: Insomnia Severity Index; BDI: Beck Depression Inventory; NES: Night Eating Syndrome; NEQ: Night Eating Questionnaire; BMI: Body Mass Index; $p < 0.05$.

DISCUSSION

To our knowledge, this study is the first to investigate the prevalence of NES, a severe mental illness, in individuals who are overweight or obese. This study also evaluated the relationship between NES, quality of life and sleep. NES was diagnosed through clinical interview in 7.6% of the patients, and was diagnosed via the NEQ (with a score of ≥ 25) in 16.5% of the patients. In accordance with the literature, the prevalence of NES was higher with the self-report NEQ than with clinical interviews (Palmese et al. 2013). Palmese et al. (2013) suggested that the significant difference between NEQ and clinical interview in diagnosing NES might be because patients diagnosed with schizophrenia may be misunderstanding and/or misinterpreting questions.

Lundgren et al. (2010) reported a prevalence of NES of 25% in a patient group on a weight loss program that included subjects diagnosed with major depression. That high prevalence of NES, compared to that in our current study (7.6%), may be associated with NES being more common in subjects diagnosed with depression. Studies have also reported that patients with NES have more depressive symptoms and are more frequently diagnosed with depression (Küçüköncü and Beştepe 2014, Saraçlı et al. 2015, Orhan et al. 2011). Another study reported a prevalence of NES of 12% in a group of obese patients with schizophrenia and schizoaffective disorder who were taking part in a weight loss program (Palmese et al. 2013). One reason for the greater prevalence of NES in these two previously published studies may be the selection of patients seeking treatment. Higher levels of NES are reported in individuals with severe mental illness and obesity who are seeking treatment by joining a weight loss program (Lundgren et al. 2010). It has also been suggested that sampling group characteristics, different scales being used to diagnose NES, and differences in cultural features may also be implicated in the diverse results relating to the prevalence of NES.

The higher prevalence of NES (7.6%) in our patient group when compared to that of the general population (1.5%) may be associated with stress, sleep disturbances and drug use. Studies have shown that NES is associated with stress and additional psychiatric diseases (Colles et al. 2007, Lundgren et al. 2008). Individuals with severe mental illness are exposed to factors in daily life such as stigmatization, limited financial resources, and health problems, all of which can lead to NES. In addition, sleep disturbances are commonly found in individuals with severe mental illness, which also can contribute to night eating behaviors. The psychotropic drugs used by these mentally ill patients, and particularly atypical antipsychotics, can increase the risk of NES by increasing hunger and satiety.

Few data are available concerning the relationship between the prevalence of NES and gender. Some studies have reported that the male gender is a risk factor for NES, but we found no difference in terms of gender between the NES group and the non-NES group in our current study. Other studies have also reported that gender is not a significant risk factor for NES (Küçüköncü and Beştepe 2014, Saraçlı et al. 2015)

While previous reports have described BMI as a risk factor for NES (Lundgren et al. 2010, Saraçlı et al. 2015), we observed no difference in BMI in our current study. Our study group was restricted to individuals who are overweight or obese, and therefore, the limited BMI range in our study might have led to this finding. Previous studies have reported a correlation between obesity and the prevalence of NES in the general population (Rand et al. 1997, Ceru-Björk et al. 2001, Gluck et al. 2001). However, only two studies have reported higher BMI in a group diagnosed with NES when psychiatric patients with or without a diagnosis of NES were compared (Lundgren et al. 2006, Küçüköncü and Beştepe 2014).

In our current study, we found no difference in terms of BDI between the groups with and without NES, although previous studies have reported higher depression levels in groups with NES (Gluck et al. 2001, Palmese et al. 2013, Saraçlı et al. 2015). In addition, Orhan et al. (2011) reported a higher incidence of NES in patients with depression who were treated on an outpatient basis (35.2%) compared to a healthy control group (19.2%). We believe that the lack of any difference between the NES and non-NES groups in terms of depression symptoms in the current study may be attributed to the fact that the study group was composed of patients who were not in the active stage of the disease.

Previous studies have reported higher levels of nicotine and substance dependence in patients diagnosed with NES (Lundgren et al. 2006, Saraçlı et al. 2015). One study observed a significantly higher number of patients with nicotine dependence in a group diagnosed with NES (Saraçlı et al. 2015). In contrast, we found no significant difference in terms of nicotine use between groups with or without NES in our current study. In contrast to nicotine use, alcohol use disorder is not culturally widespread in Turkey. The number of patients using alcohol in the current study was therefore too low to permit statistical analysis.

Sleep disturbances have been shown to compromise quality of life in patients with severe mental illness, as they exacerbate psychotic symptoms and adversely affect the course of the disease (Goldman et al. 1996, Chemerinski et al. 2002). Sleep disturbances in the general population are associated with factors that impair the quality of physical health, such as obesity. Studies have shown that the quality of life of schizophrenia patients with severe sleep disturbance is lower than those with little or no sleep disturbance (Palmese et al. 2011). It is unclear whether patients diagnosed with schizophrenia adopt night eating behaviors as a result of sleep disturbance, or whether they wake at night in order to eat, and thus experience insomnia (Palmese et al. 2013). In our current study, quality of sleep was worse and insomnia was more severe in the group diagnosed with NES than in the group without NES. Similar to our study, Palmese et al. (2011) reported an association between insomnia and increased night eating. The NES group in that study also had lower quality of life scale scores. In contrast to our current findings, the literature reports no difference in terms of quality of life scale scores

between patients diagnosed with schizophrenia and obesity with or without NES (Palmese et al. 2013).

In conclusion, NES is more common in overweight or obese patients with severe mental illness, and is also associated with insomnia and low quality of life. Due to its high levels of specificity and sensitivity, the NEQ can be used as a useful screening test for the diagnosis of NES. Published data regarding factors leading to NES and the interactions between those factors is limited. Further studies investigating the effects of factors such as drug use, obesity, sleep problems and psychiatric diseases in NES using multivariate analyses in large sample groups are required.

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