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The prevalence of night eating syndrome and binge eating disorder among overweight and obese individuals with serious mental illness[☆]

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Abstract

The prevalence of night eating syndrome (NES) and binge eating disorder (BED) was assessed among overweight and obese, weight-loss-seeking individuals with serious mental illness (SMI). Sixty-eight consecutive overweight (BMI 25 kg/m²) and obese (BMI 30 kg/m²) individuals with SMI (mean age=43.9 years; mean BMI=37.2 kg/m²; 67.6% Caucasian, 60.3% female) who were enrolled in a group behavioral weight loss treatment program were assessed at baseline for NES and BED with clinician-administered diagnostic interviews. Using conservative criteria, 25.0% met criteria for NES, 5.9% met criteria for BED, and only one participant met criteria for both NES and BED. This is the first study to find that obese individuals with SMI, compared with previously studied populations, are at significantly greater risk for NES, but are not at greater risk for BED. Stress, sleep, and medication use might account for the high prevalence of NES found in this population.

Keywords

Obesity; Night eating syndrome; Binge eating disorder; Serious mental illness

1. Introduction

Persons with serious mental illness (SMI) are at increased risk of overweight and obesity compared with the general public (Dickerson et al., 2005). The mechanism of excess weight accumulation in this population is not fully understood; it is thought to be related both to physiological changes in hunger, satiety, and metabolism associated with medication use and to lifestyle factors such as increased sedentary behavior (Allison et al., 1999; Allison and Casey, 2001). Night eating and binge eating, two correlates of obesity, may be more common among persons with SMI than among those without psychiatric disorders (Bulik et al., 2002; Lundgren et al., 2006); these eating behaviors may consequently contribute to excess weight among persons with SMI.

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Binge eating disorder (BED) is characterized by the consumption of an unusually large amount of food in a discrete period of time accompanied by perceived sense of loss of control over the eating episode; three of five qualifiers must be met: eating more rapidly than usual, eating until uncomfortably full, eating large amounts of food when not physically hungry, and eating alone because one is embarrassed, or feeling disgusted, depressed, or very guilty after a binge eating episode (DSM IV TR).

Individuals with BED often report lifetime histories of depression (Telch and Stice, 1998; Yanovski et al., 1993), but few studies have reported the prevalence of BED among individuals with serious mental illness, such as schizophrenia and bipolar disorders. Ramacciotti and colleagues (2004) assessed symptoms of BED among 31 adults diagnosed with schizophrenia. Among this primarily overweight and obese group (71% with a body mass index [BMI] of ≥ 25 kg/m²), five patients (16%) met criteria for BED, three of whom reported the onset of BED after treatment with atypical antipsychotics. Similar prevalence rates of BED among patients with bipolar disorder have been reported, ranging from 11.5% to 13.0% (Krüger et al., 1996; MacQueen et al., 2003). These prevalence rates are higher than that found among the general population (2%) (Spitzer et al., 1992), but are not uncharacteristic of an obese, non-psychiatric population (8.9% to 18.8%) (Brody et al., 1994; Stunkard et al., 1996).

NES is characterized as a delay in the circadian intake of food and manifested by evening hyperphagia and/or nocturnal awakening with ingestion of food three or more times/week (O'Reardon et al., 2004; Stunkard et al., 1955). Reviews by de Zwaan and colleagues (2003) and Striegel-Moore and colleagues (2008) highlight that varying NES diagnostic criteria have appeared in the literature over the past 50 years, and suggest that further information on the nature and prevalence of NES in diverse populations is needed. In a study of general psychiatric outpatients (of all body mass indices), Lundgren and colleagues (2006) found that 12.3% of patients met criteria for NES, a rate that is significantly higher than the prevalence of NES in the general population (1.5%, Rand et al., 1997) and similar to the prevalence of NES among obese samples (6–16%) (Adami et al., 1999; Ceru'-Björk et al., 2001). With regard to co-morbid psychopathology, 30.6% of the patients with NES met criteria for a lifetime substance use disorder, compared with 8.3% of non-night eaters. Additionally, patients with NES were more likely to be prescribed more than one atypical antipsychotic than patients without NES (38.8% vs. 30.8%, respectively). Although this sample was, on average, overweight (mean BMI=29.1 kg/m²), obese psychiatric patients (BMI ≥ 30 kg/m²) were 5 times more likely to meet criteria for NES than non-obese psychiatric patients (BMI 18.5–25.9 kg/m²).

These studies suggest that persons with SMI are at increased risk for BED and NES compared with the general population. The current study replicated and expanded the previous studies of NES and BED among psychiatric samples. In particular, we assessed the prevalence of both NES and BED, as well as their co-morbidity, in a sample of obese, weight-loss-seeking individuals with SMI.

2. Methods

Sixty-eight consecutive overweight (BMI ≥ 25 kg/m²) and obese (BMI ≥ 30 kg/m²) individuals with SMI who were enrolled in a randomized, group behavioral weight loss treatment study were assessed at baseline for NES and BED. Participants were part of a larger study funded by the National Institute of Mental Health titled "A Psychiatric Rehabilitation Approach to Weight Loss" and included both those patients randomized to the treatment and control conditions. Participants were recruited for the larger treatment study through posters, announcements at group meetings, and referrals from case managers

at two community mental health treatment facilities in the greater Kansas City area. Participants were eligible for the larger study if they were between the ages of 16 and 65 years, overweight or obese, were diagnosed with a serious mental illness by their psychiatrist, and if their psychiatrist deemed them competent to make medical decisions. Anyone needing a guardian for medical decision making was not enrolled. Subjects meeting eligibility requirements were enrolled in the study until the number of subjects needed was obtained.

SMI was operationalized according to National Institute of Mental Health (1991), which included a diagnosis of a schizophrenia spectrum disorder or mood disorder and evidence of impaired functioning for at least 2 years. Similar to the Lundgren et al. (2006) study of outpatient psychiatric patients, the chart diagnoses of experienced psychiatrists were used to establish the psychiatric diagnoses. In fact, the diagnostic category did not distinguish medication use. We decided not to limit the participants to a single mental disorder diagnosis because individuals with schizophrenia and mood disorders share the same predisposing factors for obesity (poor health behaviors, lack of resources, low income and medications with side effects of weight gain).

After complete description of the study to the participants, written informed consent was obtained. The study protocol was approved by the institutional review boards of the University of Kansas Medical Center and the University of Missouri-Kansas City.

Participants were assessed at baseline on the following: age, gender, ethnicity, education, psychiatric diagnoses, psychiatric medication use, and shift work. Height and weight were measured, and BMI (kg/m^2) was computed.

Night eating behaviors were assessed with an expanded clinician-administered version of the *Night Eating Questionnaire* (NEQ) (Allison et al., 2008). The NEQ is a self-report measure of NES symptom severity, with scores ranging from 0 to 52 (Allison et al., 2008). Its reliability and validity have been established, and it has a positive predictive value of 62% using a cutoff score of 25 in a psychiatric population (Allison et al., 2008). For the current study, the NEQ was modified such that participants were read the questions while being shown cards with the response choices. Participants could either respond verbally or indicate their response by pointing to their choice on the corresponding visual cue card. This interview version of the NEQ included questions used in the Lundgren et al. (2006) study, and assessed the behavioral and psychological symptoms of NES during the past 28 days. Evening hyperphagia estimates were based on the participants' response to the question "How much of your daily food intake do you consume after suppertime?" Response choices were 0%, 1–25%, 26–50%, 51–75%, or 76–100%. Nocturnal awakening and ingestions of food were assessed with a two-part question: "When you get up in the middle of the night, how often do you snack?" If the participant reported sometimes or greater, the interviewer asked the participant to estimate the number of nocturnal ingestions during the previous 28 days. Distress and impairment in functioning related to night eating were also assessed.

BED was assessed by a clinical interview based on the Diagnostic and Statistical Manual 4th Ed Research Diagnostic Criteria questions for Binge Eating Disorder (DSM IV TR) that have been used in previous studies (Lichtenstein et al., 2006). The questions on the interview were modeled after the Eating Disorder Examination (Fairburn and Cooper, 1993) and the Questionnaire on Weight and Eating Patterns (Yanovski, 1993). Specifically, participants were asked if they "had ever had a binge eating episode when you ate what most people would regard as an unusually large amount of food in a short period of time." If a participant responded affirmatively, he/she was asked to describe in detail the amount and type of food consumed and when the binge eating episode occurred. Interviewers used the

EDE guidelines for determining when an amount of food consumed was unusually large. For participants who consumed an unusually large amount of food, a follow-up question “when you were binge eating, did you feel that your eating was out of control?” was asked. Again, for those responding affirmatively, participants were asked questions regarding the associated features of their binge eating (i.e., DSM IV TR, criteria B), distress and impairment resulting from binge eating, frequency and duration of binge eating, and compensatory behaviors. Participants were diagnosed with BED if they reported objective bulimic (binge) episodes, loss of control during the binge episode, met three of the five previously mentioned qualifiers (criteria B), reported distress and/or impairment in functioning, and their binge eating was not associated with the regular use of compensatory behaviors.

All interviews were conducted by bachelor’s and master’s level research assistants and were supervised by a clinical psychologist with experience in the assessment of NES and BED (JDL). All interview data, in particular the BED dietary recall data, were reviewed by the interviewers and the supervisor to ensure accuracy. When interviewers or the supervisor did not agree that the size of a binge eating episode was unusually large according to the EDE guidelines, it was coded “negative.”

2.1. Statistical analyses

Prevalence rates are presented in percentages; *t*-tests were used to compare patient groups on demographic and psychiatric variables. For all *t*-tests, significance was set at $P < 0.05$.

3. Results

3.1. Participant characteristics

Table 1 shows the participants’ demographic characteristics. Participants were on average 43.9 ± 10.4 years of age and had a measured mean BMI of 37.2 ± 8.1 kg/m². The age at which participants reported first becoming obese was 26.1 ± 14.5 years old. The majority of the sample was female (60.3%) and Caucasian (67.6%); 88.2% had a high school or college education. Three patients reported shift work during the 3 months preceding the assessment; because meal times for shift workers are non-normative, these participants were excluded from prevalence estimates for NES, but not for BED. Primary psychiatric diagnoses were as follows: 27.1% schizophrenia, 28.6% schizo affective disorder, 17.1% bipolar disorder, 25.7% major depressive disorder. One participant, had a primary diagnosis of a personality disorder, and was included in the study because of functional impairment. The average number of currently prescribed psychotropic medications was 3.4 ± 1.6 (range 1–6 medications).

3.2. Prevalence of NES

The average Night Eating Questionnaire (NEQ) score for the sample (excluding shift workers) was 19.0 ± 7.3 points (out of 52 points). Because evening hyperphagia criteria have varied in the literature from 25% to 50% of total daily calories after the evening meal (de Zwaan et al., 2003), we examined the prevalence of evening hyperphagia using varying criteria. As expected, the prevalence of evening hyperphagia decreased as the criteria became more stringent (Table 2).

One participant reported a lack of awareness during nocturnal eating episodes, indicative of sleep-related eating disorder (Winkelman, 1998), and was excluded from nocturnal ingestion estimates. Of the remaining participants, 31 (45.5%) reported at least one nocturnal awakening and ingestion of food during the previous 28 days; 16 (23.5%) of the participants reported 3 nocturnal ingestions per week during the previous 28 days.

Table 2 shows the prevalence estimates of NES based on varying diagnostic criteria. A conservative estimate of NES in this sample, using the 50% evening hyperphagia and/or 3 nocturnal ingestions of food/week, is 25.0%. Three participants meeting conservative criteria for NES reported both evening hyperphagia and nocturnal ingestion of food criteria. Of those who met criteria for NES ($n=17$), most (76.4%) reported difficulty with night eating for at least 1 year or longer, and most participants reported distress (88.2%) or impairment in functioning due to night eating (94.1%).

Patients who met criteria for NES ($n=17$) were compared by *t*-tests with those who did not meet criteria for NES on age, gender, ethnicity, BMI, and number of medications. No statistically significant differences were found (all $p>0.05$). Participants were not compared on psychiatric diagnoses, as several participants met criteria for more than one Axis I psychiatric disorder.

3.3. Prevalence of BED

Ten participants (14.7%) reported at least one objective binge eating episode during the past month. Of those, only four participants (5.9%) met full criteria for BED: two objective binge episodes/week, perceived loss of control over eating, and three of five binge eating qualifiers (i.e., eating more rapidly than usual, eating until uncomfortably full, eating large amounts of food when not physically hungry, eating alone because one is embarrassed, or feeling disgusted, depressed, or very guilty after a binge eating episode). All four participants reported distress and impairment in functioning due to the binge eating behavior. Three participants with BED reported having binge eating episodes for 1 year or longer; one participant reported the onset within the past 3–5 months. The number of participants meeting criteria for BED was too small for statistical comparisons.

3.4. Comorbidity of NES and BED

Only one participant met criteria for both NES (50% evening hyperphagia and/or three nocturnal ingestions of food per week) and BED.

4. Discussion

This study aimed to replicate and extend previous research suggesting that psychiatric populations, in particular individuals with SMI, are at increased risk for NES and BED. The prevalence of NES, using conservative NES criteria, among obese individuals with SMI (25%) is greater than that which has been reported among non-psychiatric obese samples (6–16%) (Adami et al., 1999; Ceru'-Björk et al., 2001) and among general psychiatric samples of all body mass indices (12.3%) (Lundgren et al., 2006). Caution should be used when comparing these findings to previous studies, however, because of the various criteria used to diagnose NES in the previous literature (de Zwaan et al., 2003). For this reason, we examined the prevalence of NES using evening hyperphagia criteria of both 25% and 50% of total daily food intake after the evening meal.

Of note, obese individuals with SMI appear to be at significantly greater risk for NES than for BED, and there is little co-morbidity between these clinical syndromes among this population. Further study is necessary to understand the relationship of night eating and binge eating to both weight gain and to difficulty with weight loss among this population.

In contrast to the study of Lundgren and colleagues (2006), night eating was not associated with BMI in this sample. This is likely because the BMI range was restricted to overweight and obese individuals; future studies are needed to examine prospective changes in weight among seriously mentally ill individuals with NES of all weight ranges.

Several factors may explain the high prevalence of NES in this sample, including stress, sleep disturbance, and properties of patients' medications. NES has long been associated with stress and psychological co-morbidity (Stunkard et al., 1955; Lundgren et al., 2008; Gluck et al., 2001; Colles et al., 2007), and persons with SMI face daily life stressors including poor health, limited financial resources, and stigma (Carney et al., 2006; Depp et al., 2006; Evans et al., 2007). The sleep of individuals with SMI is often disturbed (Monti and Monti, 2005), which could increase the likelihood of nocturnal ingestions of food. Sleep disturbance also increases the likelihood that an individual will be prescribed psychotropic medications (e.g., hypnotics) known to increase nocturnal eating with limited awareness (i.e., Sleep-related Eating Disorder; Winkelman, 2006). In the current study, however, participants must have reported awareness of nocturnal ingestions of food to be a considered NES positive, and all but one participant who endorsed nocturnal ingestions of food reported some degree of awareness while eating. It is also well documented that psychotropic medications, in particular atypical antipsychotics, affect hunger and satiety (Zimmerman et al., 2003), which could put one at increased risk for NES. It is quite plausible that these factors interact to put one at even greater risk than non-psychiatric populations. The high prevalence, however, could also be due to sampling bias, as this sample was a unique group of obese treatment-seeking individuals with SMI. Non-treatment-seeking obese individuals with SMI might not report such high rates of NES.

Full threshold BED was not prevalent among this sample. Objective and subjective binge eating episodes, however, were more commonly reported and were often anecdotally associated with group meals consumed at buffet restaurants. Although the prevalence of BED (5.9%) among our sample was less than that reported in previous studies of both patients with schizophrenia and bipolar disorder (11.5% to 16.0%) (MacQueen et al., 2003; Ramacciotti et al., 2004), all are certainly within the range normally reported among obese non-psychiatric samples.

The study's limitations, including the use of a clinician-administered interview to assess NES and BED rather than prospective food records and a sample that is limited in its representativeness (i.e. obese, weight-loss-seeking individuals diagnosed with a serious mental illness), do not negate the importance of these findings. This is the first study to assess the prevalence of NES, BED, and their co-morbidity among obese individuals with serious mental illness. BED was not common among this sample; NES was prevalent and was often accompanied by distress and/or impairment in functioning associated with the night eating. 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 obese individuals with SMI.

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Table 1

Participant demographic characteristics.

Variable	Mean±S.D. or %
Age (years)	43.9±10.4
Body mass index (kg/m ²)	37.2±8.1
%Female	60.3%
%Caucasian	67.6%
Primary psychiatric diagnosis	
Schizophrenia	27.1%
Schizoaffective disorder	28.6%
Bipolar disorder	17.1%
Major depressive disorder	25.7%
Number of psychiatric medications	3.4±1.6

Table 2

Prevalence estimates of NES and BED using varying diagnostic criteria.

Diagnostic criteria	Prevalence N (%)
Evening hyperphagia (EH)	
25%	19 (29.2%)
50%	4 (6.2%)
3 Nocturnal ingestions/week	16 (25.0%)
EH 25% and/or 3 nocturnal ingestions/week	26 (40.0%)
EH 50% and/or 3 nocturnal ingestions/week	17 (25.0%)
Objective binge eating episode during the previous 28 days	10 (14.7%)
DSM IV TR criteria for binge eating disorder	4 (5.9%)

Evening hyperphagia is the percent of daily food intake consumed after the evening meal. The one participant without awareness of nocturnal ingestions of food was excluded from nocturnal ingestion prevalence estimates, but not evening hyperphagia estimates. Objective binge eating was operationalized per guidelines outlined in the eating disorder examination (Fairburn and Cooper, 1993).