



## Night eating patterns of individuals with eating disorders: Implications for conceptualizing the night eating syndrome

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### ABSTRACT

The prevalence, correlates, and symptom coherence of night eating syndrome (NES) in individuals seeking inpatient treatment for eating disorders were assessed. Inpatients ( $n = 68$ ;  $M$  age = 29.8 years; % female = 94.1; % diagnosed with anorexia nervosa [AN] = 47.1; % diagnosed with bulimia nervosa [BN] = 47.1) were interviewed with the Night Eating Syndrome History and Inventory. Additionally, medical charts were reviewed and participants completed measures of eating behavior and quality of life. NES was diagnosed in 25% of patients; significantly more patients diagnosed with BN meet criteria for NES compared to those diagnosed with AN. In general, patients with NES did not differ from patients without NES on eating behaviors, attitudes, or quality of life; symptoms of NES frequently co-occurred. This study supports previous research finding that night eating behavior is common in individuals diagnosed with eating disorders.

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### 1. Introduction

Night eating syndrome (NES) was first recognized in the 1950s as a pattern of circadian delayed eating behavior affecting obese individuals (Stunkard et al., 1955). Since this first observation the NES literature has grown, and more is known about the prevalence of NES in different populations (Stunkard et al., 1996; Rand et al., 1997; Lundgren et al., 2006; Striegel-Moore et al., 2006), its psychiatric and medical co-morbidities (Lundgren et al., 2006; Morse et al., 2006; Colles et al., 2007; Lundgren et al., 2008a, 2010), associated neuroendocrine and sleep features (Birketvedt et al., 1999; O'Reardon et al., 2004; Allison et al., 2005; Rogers et al., 2006), and potential etiological factors (Lundgren et al., 2008b, 2009; Stunkard et al., 2009).

Despite these advances, the field has lacked a standardized research diagnostic criteria set (Striegel-Moore et al., 2009). In April 2008 the first international NES symposium was held at the University of Minnesota, the goals of which were to share research findings among eating and sleep disorder experts and to develop research diagnostic criteria for NES. These aims were accomplished and the proposed criteria have recently been peer reviewed and published (Allison et al., 2010; see Table 1).

Criterion F suggests that a diagnosis of NES should not be given when the night eating and associated behaviors are *secondary* to substance use, medical disorder, medication, or another psychiatric disorder. In contrast to previously proposed NES criteria (e.g., Birketvedt et al., 1999) these new criteria do not specifically indicate that a NES diagnosis cannot be given concurrently with another eating disorder diagnosis (i.e., anorexia nervosa [AN], bulimia nervosa [BN], or eating disorder not otherwise specified [EDNOS], which includes binge eating disorder [BED]). The rationale for excluding eating disorders from the F criterion was that there is a need for more research on the relationship between NES and AN, BN, and EDNOS (Lundgren et al., 2008a,b,c; Allison et al., 2010); a classification system that prevents dual diagnoses could stifle future research efforts. It is possible, however, that a diagnosis of NES lacks clinical utility when night eating occurs in the context of other eating disordered behaviors. For example, this is the case when anorexia nervosa (AN) or bulimia nervosa (BN), rather than binge eating disorder (BED), are the given diagnoses when binge eating occurs in the context of compensatory behaviors or refusal to maintain body weight.

Little is known about the relationship between NES and other eating disorders because 1) previous conceptualizations of NES were developed in the context of obese and non-obese, *non-eating disordered* populations (e.g., Stunkard et al., 1955; Birketvedt et al., 1999; O'Reardon et al., 2004; Lundgren et al., 2008a) and 2) studies of NES have frequently excluded research participants with current eating disorder diagnoses (e.g., O'Reardon et al., 2004; Lundgren et al., 2008a), thereby limiting understanding of the relationship between NES and other eating disorders. Of the few studies that have examined

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**Table 1**  
Research diagnostic criteria for night eating syndrome (Allison et al., 2010).

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: <ol style="list-style-type: none"> <li>1. At least 25% of food intake is consumed after the evening meal</li> <li>2. At least two episodes of nocturnal eating per week</li> </ol>
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: <ol style="list-style-type: none"> <li>1. Lack of desire to eat in the morning and/or breakfast is omitted on four or more mornings per week</li> <li>2. Presence of a strong urge to eat between dinner and sleep onset and/or during the night</li> <li>3. Sleep onset and/or sleep maintenance insomnia are present four or more nights per week</li> <li>4. Presence of a belief that one must eat in order to initiate or return to sleep</li> <li>5. Mood is frequently depressed and/or mood worsens in the evening</li> </ol>
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, medical disorder, medication, or another psychiatric disorder.

the prevalence of eating disorders among persons with NES, significant overlap has been noted (e.g., de Zwaan et al., 2006).

Studying night eating in the context of other eating disorders, and the implications of this behavior for conceptualizations of NES as an independent eating disorder, are in need of greater research attention. Independent of diagnostic considerations, it is also important to understand the extent of night eating in persons with AN, BN, and EDNOS so that interventions can address the night eating behavior.

Nocturnal eating has been reported in persons diagnosed with eating disorders, primarily BN and BED (Guirguis, 1986; Williamson et al., 1989; Gupta, 1991; Greeno et al., 1995; Winkelman et al., 1999; Grilo and Masheb, 2004; Tzischinsky and Latzer, 2004; Lundgren et al., 2008c). For example, Greeno et al. (1995) examined the prevalence of nocturnal eating in obese women diagnosed with BED and weight and age matched controls. Six (15%) of the women with BED, but no control women, reported nocturnal eating. The nocturnal calories consumed varied widely ranging from 141 kcal to over 1000 kcal, indicating that not all episodes of nocturnal eating met the criteria for an objective bulimic episodes (i.e., objectively large amount of food and loss of control over eating); two of the six participants reported that during their nocturnal eating episode they were in control and that the episode was *not* a binge.

Similarly, Grilo and Masheb (2004) assessed nocturnal eating among 207 individuals seeking treatment for BED. Using the Eating Disorder Examination (EDE; Fairburn and Cooper, 1993) to diagnose BED and assess the frequency of nocturnal eating episodes, they found that 28% of participants with BED reported nocturnal eating during the previous 28 days. Interestingly, nocturnal eating was reported more frequently by men with BED than by women with BED (42% versus 24% respectively) (Grilo and Masheb, 2004). There were no significant differences in the number of days or number of episodes of binge eating between the nocturnal eating and non-nocturnal eating groups.

Similarly high nocturnal eating prevalence rates have been documented in individuals with BN. In a small study of night eating among individuals with BN enrolled in an outpatient cognitive-behavioral therapy intervention, 35.8% of patients reported evening hyperphagia (EH) and 38.7% reported nocturnal ingestions of food (NI) during the previous month (Lundgren et al., 2008c). In this study, all participants reported awareness of their nocturnal eating episodes, but other reports of nocturnal eating among eating disordered samples have described eating patterns consistent with sleep-related eating disorder (SRED), rather than NES. SRED is somnambulistic eating in which persons have little to no awareness of their nocturnal ingestions, and they may consume odd or non-food items (Schenck and Mahowald, 1994).

For example, Gupta (1991) reported that 31% of a consecutive series of 32 outpatients with BN reported eating during the night with

little to no awareness at least two to three times in the previous month. Similarly, Winkelman et al. (1999) surveyed 126 outpatients and 24 inpatients with eating disorders, 126 obese persons in an anorexic agent trial, 207 depressed persons in an antidepressant trial, and 217 college students. They assessed both SRED (defined as “eating during an arousal from sleep with altered awareness”) and simple nocturnal eating (defined as “maintenance of normal awareness... throughout the nocturnal eating episode”) (Winkelman et al., 1999, p. 1462). They reported a prevalence of SRED of 16.7% in the inpatient eating disorders group, nearly double that of the outpatient group at 8.7%; rates of simple nocturnal eating for the eating disordered samples were not reported. Of the eating disordered patients with SRED, 67% had BN and 33% had AN. These rates were both higher than the student (4.6%), depressed (3.4%), and obese groups (1.0%).

Of note, of the total sample of participants in the Winkelman et al. (1999) study who were classified as meeting criteria for SRED (33/700, including the eating disordered, obese, depressed, and college samples), there was variability in the degree of awareness of nocturnal eating episodes, with 4 participants reporting amnesia only occasionally. This highlights the limitations of categorizing nocturnal eating syndromes based on a dichotomous classification of awareness/no awareness and may not be reflective of the complexity of actual patient experiences. The high prevalence of nocturnal eating in these eating disordered samples, regardless of patients' levels of awareness while eating, is worth noting.

Finally, as Striegel-Moore et al. (2009) suggest, an important part of better understanding the validity and clinical utility of NES is to examine the coherence (or co-occurrence) of symptoms. No study to date has examined the co-occurrence of the recently proposed NES research diagnostic criteria (Allison et al., 2010), particularly in a sample of individuals with AN, BN, or EDNOS. The only study to empirically address the utility of NES criteria used item response theory (IRT) to examine the ability of five NES symptoms (i.e., morning anorexia, delayed morning meal, nocturnal eating and/or evening hyperphagia, initial insomnia, and nighttime awakenings) to differentiate persons with and without NES (Allison et al., 2008a). Using a diverse sample of participants who had previously completed the Night Eating Questionnaire (NEQ), Allison et al. (2008a) found that three symptoms were able to discriminate those with night eating problems from those without night eating problems: nocturnal eating and/or evening hyperphagia, initial insomnia, and nighttime awakenings. Although this report suggests that some symptoms of NES are more discriminatory than others, it does not answer questions such as “what is the probability of having nocturnal ingestions, given that one reports evening hyperphagia.”

### 1.1. Aims of the current study

The current study had four aims: 1) to examine the prevalence of night eating behavior, broadly defined (i.e., evening hyperphagia and nocturnal ingestions of food), in a sample of individuals seeking inpatient treatment for AN, BN, and EDNOS, 2) to examine the prevalence of NES using the recently proposed research diagnostic criteria, 3) to compare the eating attitudes, behaviors, and quality of life of persons with eating disorders who do and do not meet criteria for NES, and 4) to examine the coherence of NES symptoms in this population.

## 2. Methods

### 2.1. Participants and procedure

Participants included 68 individuals seeking inpatient treatment in a comprehensive, hospital-based eating disorder treatment program. Recruitment for this study occurred in the context of a larger assessment study on the inpatient unit, during which patients were evaluated on night eating behavior, general eating disorder symptoms and treatment history, and their caregivers provided information on caregiving experiences. Data collection occurred from August 2007 until August 2009. Upon intake, all consecutive inpatients ( $n = 141$ ) were approached about the study; patients who were interested were enrolled and provided informed consent for participation. Of

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