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Proposed Diagnostic Criteria for Night Eating Syndrome

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Abstract

Objective—To propose criteria for diagnosis of the night eating syndrome (NES).

Method—An international research meeting was held in April 2008, and consensus criteria for NES diagnosis were determined.

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Results—The core criterion is an abnormally increased food intake in the evening and nighttime, manifested by (1) consumption of at least 25% of intake after the evening meal, and/or (2) nocturnal awakenings with ingestions at least twice per week. Awareness of the eating episodes is required, as is distress or impairment in functioning. Three of five modifiers must also be endorsed. These criteria must be met for a minimum duration of 3 months.

Discussion—These criteria help standardize the definition of NES. Additional aspects of the nosology of NES yet to be fully elaborated include its relationship to other eating and sleep disorders. Assessment and analytic tools are needed to assess these new criteria more accurately.

Introduction

The night eating syndrome (NES) was first described in 1955 as a disorder characterized by morning anorexia, evening hyperphagia, and insomnia.¹ The disorder was thought to be a response to stress, and it was originally studied among obese persons who were refractory to standard weight loss treatment. Different criteria have been used since this original description (see Refs. 2–4), including a major modification by including nocturnal ingestions (i.e., waking during the sleep period to eat) by Birketvedt et al. (1999).⁵ In the past 10 years, 74 research articles and reviews have been published on NES (PubMed search and authors' in press publications, February 2009), and our understanding of this disorder has greatly increased. Thus, the First International Night Eating Symposium (April 26, 2008, Minneapolis, MN) brought together expert investigators in this area who reached consensus on a set of provisional diagnostic criteria for NES.

There are at least five reasons for recognizing disorders in the official diagnostic nomenclature. First, medical and mental health care providers need an official set of clearly defined criteria to diagnose a cluster of signs and symptoms reliably as a syndrome. Without commonly accepted criteria, clinicians from diverse fields do not have a unified framework through which to recognize patients' symptoms. Second, efforts to study a syndrome without a standard definition are limited, because results cannot be compared across samples, in both clinical and epidemiological studies. Third, a standardized definition permits treatment trials to be conducted in a meaningful manner, and funding for such trials would be more attractive to both government and industry sources. Fourth, using a standard set of diagnostic criteria in studies of controlled treatment trials would provide clinicians with an evidence-based guide for treatment. Fifth, reimbursement for treatment would likely improve in countries such as the United States by third-party payers if it is recognized in official nomenclature, such as the Diagnostic and Statistical Manual of the American Psychiatric Association (DSM).⁶ Currently, many persons with these concerns are left without access to care.

In this work, we propose new diagnostic criteria for NES and their rationale, as established by the International NES Working Group. We will also discuss assessment of the new criteria, suggestions for coding each of them, comparisons with criteria for sleep-related eating disorder (SRED)⁷ and possible subtypes of the disorder (i.e., evening hyperphagia subtype and nocturnal ingestions subtype).

Diagnostic Criteria for NES

Some recent studies have conceptualized NES as a circadian delay in the pattern of food intake, manifested by one or both of the following core criteria (see Table 1): A1. Evening hyperphagia, with the consumption of at least 25% of daily caloric intake after the evening meal, and/or A2. At least two nocturnal awakenings per week with ingestions of food. Awareness, Criterion B, is required, as are three of the following core features in Criterion C that are often associated with NES: (1) morning anorexia, (2) a strong desire or urge to eat between dinner and sleep initiation and/or upon awakening at night from sleep, (3) sleep onset and maintenance insomnia, (4) the belief that one must eat in order to get to sleep, and (5) depressed mood or lowering of mood in the evening and nighttime. The remaining three criteria are required: D: Distress or impairment in functioning; E: Night eating has been present for at least 3 months; and F: The disorder is not secondary to another medical or psychiatric disorder.

Criterion A: Core Criteria: Evening Hyperphagia and Nocturnal Ingestions

Criterion A is composed of the two core features of NES. One or both of these are required: evening hyperphagia and/or nocturnal ingestions. The evening hyperphagia criterion of 25%, first proposed in 1955¹ and later in 2004⁸ was validated by 1-week food journals completed by NES and control participants. The NES participants consumed 35% of their daily intake after their evening meal, with a standard deviation (SD) of 10%, whereas the controls consumed 10% after the evening meal, with an SD of 7%.⁸ A person without NES would have to consume more than two SDs above normal after dinner to reach 1 SD below the typical intake of an NES patient (i.e. 25%). Thus, 25%, which has now survived 50 years of use, seemed to be a reasonable and logical cut point between the groups.

The definition of “after the evening meal” lends itself to controversy. Several studies have used the following definition: *The first meal consumed after 1700 hrs will be considered after dinner.* If no main meal is consumed during this time, the first snack food during this time will be considered the evening meal. If no food is consumed by 2000 hrs, any food consumed after 2000 hrs will be considered “after dinner.”^{8–11} Although no single rule will be perfect, we offer this example with the important caveat that there are culture-specific norms that will change such a decision rule. Some examples are the late evening meal in Mediterranean cultures and that many people consume late dinners, depending on their work schedules or lifestyle. If this is the case, but they do not meet any of the other criteria, then a diagnosis of NES is not warranted. We encourage researchers to make their decision rules explicit going forward, so that we can make comparisons across study populations as reliably as possible.

Birketvedt et al.⁵ did not specify a frequency required for nocturnal ingestions in their provisional criteria, but Stunkard and colleagues^{5–13} have used three nocturnal ingestions per week in various reports. These frequencies were based on clinical judgement of food-intake records. The proposed frequency of 2 per week is consistent with the frequency requirements for binge eating associated with binge-eating disorder (BED) and bulimia nervosa (BN). We as a group debated this point, but there have not yet been studies examining the clinical significance of varying frequencies of nocturnal ingestions. If we take

the case of BED, more than 15 years of research have passed since official diagnostic criteria were proposed, and the clinical and research communities are still in doubt whether one or two binge days or episodes per week should be the requirement (see Ref. 14). Thus, it is likely that NES will need a more coordinated effort than has been made so far to determine if the cut should be at 2, 3, or even 1 per week. To be more inclusive at this developmental stage of NES nosology, we have chosen the cut of at least two nocturnal ingestions per week.

Criterion B: Level of Awareness

Criterion B, persons engaging in evening and nighttime eating must be aware of their behavior and recall their ingestions the following day. This feature is required and helps distinguish NES from SRED. Persons with SRED typically eat in a sleep-walking state and at times consume nonfood or bizarre items (e.g., buttered cigarettes or pet food) and may have partial or complete amnesia for the feeding episodes. There may be some overlap between the disorders, as recently reviewed.¹⁵ Many persons with NES do not have problems remembering exactly what occurs during nocturnal ingestions, while others may have clouded consciousness and report that the behavior is “automatic.” However, when asked with more prompting to recall the eating episodes, they are able, and their awareness and insight into these episodes typically grows during the course of treatment.^{16,17}

Criterion C: Core Descriptors

Aside from the presence of at least one of the two core diagnostic criteria, at least three of the five signs and symptoms presented in Criterion C should also be present.

Descriptor C1, morning anorexia, manifested by either lack of desire to eat in the morning or skipping breakfast more days than not,¹⁸ has often been described as part of the syndrome since its original conception.¹ Although morning anorexia is common among study participants with NES, it occurs widely and is not specific to the syndrome. In a study that used item response theory analysis, morning anorexia did not add significant information to the overall construct of NES.¹⁹ Thus, it is included as a descriptor, but is not a required element of the diagnosis.

Descriptor C2, a strong desire or urge to eat between dinner and sleep initiation and/or upon awakening at night from sleep, has been described as present among some patients with NES, as assessed by the Night Eating Questionnaire (NEQ).³ The urge is typically satisfied with consumption of an amount of food that is not objectively large.^{5,20} Common themes and cognitions associated with this descriptor include cravings for specific foods, anxiety and agitation, distress about sleep disruption, and feeling compelled to eat or feel full to sleep.²⁰

Descriptor C3, sleep onset and maintenance insomnia have consistently been described as part of NES. In the item response theory study noted earlier,¹⁹ sleep onset insomnia was a significant contributor to the NES construct. However, it was not present in all cases identified clinically (57 and 66% in two separate samples examined in the analysis).¹⁹ For example, an individual may wake two to three times each night and eat, but may have no

trouble falling asleep.²¹ Alternatively, a person may eat continually in the evening in order to fall asleep and then may not have awakenings once they have fallen asleep. Thus, the insomnia descriptor may be describing different forms of insomnia (onset vs. maintenance insomnia) or insomnia may not be present at all (e.g., in the case of evening hyperphagia only).

Descriptor C4, the belief that one must eat in order to get to sleep, is also included as an item on the NEQ. Vinai et al.²² have identified this belief as an important distinguishing feature between night eating and binge eating behaviors or obesity. Specifically, NES patients, but not those with BED or obesity, report a significant association between their anxiety due to their insomnia and this belief.²² The belief that good sleep is dependent on eating in the late evening or during the night may act to sustain evening hyperphagia before sleep onset and subsequent nocturnal eating.

Descriptor C5, depressed mood has also been associated with NES across several different samples.^{1,9,21,23,24} The depressed mood is typically related to the lack of control and sense of helplessness persons with NES feel over their night eating. It is closely linked also to feelings of guilt and shame. Some studies have described a worsening of mood as the day progresses,⁵ which is opposite to the pattern observed with melancholic depression in which mood improves across the day.⁶ This pattern may not be seen in all persons with NES²⁵ and is included as one of the possible NES descriptors.

Criteria D–F: Distinguishing Features and Duration

The remaining three criteria are required. *Criterion D*, as with other psychiatric disorders, significant distress or impairment in functioning must be present. This may be manifested by shame and guilt over night eating behaviors (e.g., consistently eating snacks intended for children in the household or inability to stay within a prescribed calorie limit for weight loss), distress about weight gain or fear of weight gain due to evening and nocturnal eating, and daytime tiredness or sleepiness. There are no exclusion criteria based on age or body mass index.

Criterion E, to be diagnosed with NES, the minimum duration was set at 3 months, pending further data, which mirrors the requirement for BN. *Criterion F*, the night-eating behaviors must not be secondary to other disorders, psychiatric or medical, or a side effect of medications. There is a need for more research on the relationship between NES and other eating disorders.²⁶ At the present time, they are not considered to be exclusions. Therefore, in the current DSM system, NES may be diagnosed in addition to the presence of another eating disorder, notably, BN or BED. This will be discussed in more depth below.

Recommendations and Future Research

At the First International Night Eating Symposium, the expert consensus identified several points to consider when investigating and treating NES. These include recommendations for clarifying or improving: (1) the assessment of caloric intake and the extent of evening hyperphagia and nocturnal ingestions of food, (2) coding criteria when examining the validity of the proposed criteria in future studies, (3) differential diagnoses, and (4) possible

subtypes of NES. These areas are reviewed and suggestions for future research are presented below.

Assessment of Evening Hyperphagia and Nocturnal Ingestions of Food

New analytic methods are needed to assess diurnal variation in food intake. These analytic methods would be assisted by greater precision in measurement of timing and quantity of food intake, such as ecological momentary assessment.²⁷ Importantly, new methods must consider cultural variation in meal times, such as the late-evening meal of Mediterranean cultures. Use of circadian models to assess and interpret the various periods of food intake has provided a powerful new method.^{28,29} They render less important small differences in the time of food intake among individuals, which can be incorporated in the models.

The field most recently has also relied more heavily on empirical analyses to inform the classification system for eating disorders.³⁰ Striegel-Moore et al.³¹ completed a latent class analysis of over 8,000 persons who provided 24-h food recalls and psychiatric diagnostic interviews. They found a four class solution for the night eating construct, two based on those eating a large proportion of their food after 1900 hrs, and two based on depressive symptoms. This study demonstrates the utility of empirical approaches to classification and clearly the field would benefit from further work in this area.

Laboratory feeding studies of NES patients and controls would help define pathological eating behavior, such as antecedents to evening overeating episodes or nocturnal ingestions. Such research must overcome the difficulty in reproducing critical cognitions and emotional states in the laboratory. Moreover, the development of a SCID-type module for NES would help ensure proper clinical application of this diagnosis. This module could be included in a revision of the Night Eating Syndrome History and Inventory (NESHI; unpublished interview) based on these proposed criteria.

Differential Diagnosis

NES vs. SRED—The disorder most likely to be confused with NES is SRED. The principle diagnostic criterion separating NES and SRED is the nature and content of the nocturnal eating. SRED is characterized by recurrent episodes of involuntary eating during the main sleep period, while the ingestions in NES are composed of both evening hyperphagia and nocturnal eating with awareness. SRED is classified as a parasomnia as the eating is often involuntary and poorly recalled, thus resembling sleepwalking. Furthermore, dangerous food preparation and consumption of unusual or non food items have been reported in SRED.¹⁵ Frequently, SRED patients also have an underlying sleep disorder, such as sleepwalking, restless legs syndrome, obstructive sleep apnea, or insomnia. Additionally, medication exposure, in particular, the benzodiazepine receptor agonists, such as zolpidem have been found to induce amnesic- SRED.¹⁵ Patients with NES, which could be classified as an insomnia-related disorder, have good awareness and recall of their eating episodes and consume edible food and drinks. They typically do not have a history of an underlying sleep disorder. Patients may manifest features of both syndromes; however, it is usually apparent that one is the primary clinical condition.^{15,32}

NES and Other Eating Disorders

Among individuals with NES, ~7–25% also meet criteria for BED.^{9,21,33–37} The prevalence of NES among individuals with BED ranges from 0 to 24%.^{21,35–40} Among a sample of 11,604 adult twins, the genetic association between night-eating and binge-eating core criteria was 0.60, suggesting considerable overlap in the genetic factors influencing these two behaviors.⁴¹ The prevalence of NES among individuals with BN is about 9%.²¹

NES and BED may share the common feature of evening hyperphagia, just as BED and BN share the feature of objective binge eating episodes, but sharing a behavior does not necessarily mean that two disorders share a common etiology. Among NES patients, nocturnal eating has been correlated with nocturnal anxiety, but among BED patients, even if they binge eat at night, there is little correlation between their nocturnal eating behavior and their nocturnal anxiety.⁴² Additionally, the size of evening and nocturnal ingestions is not objectively large (about 300 kcal⁵) for most persons with NES, in distinction to the much larger size in BED. Future studies should assess the prevalence of the proposed full syndrome NES in a BED population.

Only two studies have assessed the symptoms of NES in individuals diagnosed with BN. The first study examined 12 BED and 10 BN patients suffering from NES who were seeking treatment at an outpatient eating disorders clinic, and 20 BED and 29 BN age- and BMI-matched patients without NES.²¹ Both of the NES groups (BED and BN) had low-sleep efficiency, as measured by actigraphy, relative to their respective control groups. The mean number of nocturnal ingestions was 3.9 ± 2.2 per night for the BED group and 3.0 ± 2.2 for the BN group, rates similar to those found by Birketvedt et al. in a study of night eaters without other eating disorders.⁵ The Mini Sleep Questionnaire revealed severe subjective sleep disorders, and clinical data revealed high rates of traumatic life events (sexual and physical abuse) and high levels of psychiatric comorbidity among the NES BN and BED groups. Additionally, timing of sexual abuse coincided with NES onset.²¹ Approximately 5% of the outpatients presenting annually in the clinic were self-identified as having problems with night eating. No patients with anorexia nervosa (AN) were identified with NES during the research period. The results may indicate that night-eating signs and symptoms among persons with BED and BN cluster together as a discriminate subgroup of eating disorders.

The second study included 31 adult women enrolled in an outpatient cognitive-behavioral treatment study for BN who were assessed with the NEQ.²⁶ Nighttime eating behavior was common: 35.4% reported the consumption of 25% or more of total daily food intake after dinner. Similarly, 38.7% reported nocturnal ingestions of food sometimes or more frequently upon awakening at night during the month previous to the assessment.²⁶ More research is needed on the antecedents and correlates of nocturnal ingestions of food among the bulimic population to determine if both disorders can occur independently, or if BN patients are simply engaging in bulimic behaviors primarily in the evening.⁴³

No studies have been published on the nature and frequency of NES in individuals diagnosed with AN. Research on the relationship between evening and nocturnal eating as a

correlate or direct result of daytime dietary restraint among persons with AN is necessary to understand the phenomenology and extent of any co-occurrence of AN and NES.

NES Subtypes

Each criterion should be noted as absent or present in research samples in order to test the validity of each of the proposed criteria. In particular, investigators should note which of the core symptoms described in Criterion A are manifested and compare outcomes based on these subtypes. Specifically, investigators should note if (1) persons consume >25% after the evening meal, (2) exhibit >2 nocturnal ingestions per week, or (3) meet both of these criteria. A careful listing of which criteria are met should be noted with the percentage of patients who meet the threshold for each subtype and each specifier. Providing detailed records of the presence or absence of each of the proposed criteria should help advance our understanding of the clustering of these items by determining which criteria contribute the most and the least information about the construct of NES.

Additional Areas of Interest

Additional assessment in the following areas would also add to our understanding of NES. These areas include traumatic life events, psychiatric comorbidity, objective and subjective sleep monitoring, age of onset of NES, course of NES over time, effect on circadian rhythm, loss of control behavior, and clinical sample versus community sampling.

Discussion

The NES, first described over 50 years ago, has been the object of considerable research in the past decade. This research has established two core criteria: (1) the consumption of at least 25% of daily caloric intake after the evening meal and/or (2) evening awakenings with ingestions at least twice per week. Five descriptors have been added to the core criteria, three of which are required for the diagnosis of NES (Table 1). Additionally, persons must be aware of their nocturnal ingestions, they must experience distress or impairment in functioning, and they must have experienced the signs and symptoms for the past 3 months.

Further understanding of NES will require definitions to differentiate it from SRED and three other eating disorders: AN, BN, and BED. Progress in this effort has revealed modest overlap between NES and BED and an uncertain relationship between NES and AN and BN. More research differentiating SRED from NES is also needed. Advancing our assessment of NES is essential in this process, including new interview methods and analytic techniques. One such technique is a mathematical analysis that confirms the circadian rhythm of food intake in NES, with a 2-h delay, that provides a powerful integrative framework for the timing of food intake and how treatment affects it.

These diagnostic criteria should advance our understanding and treatment of NES for the many persons who suffer from it, by providing a consistent framework for researchers, clinicians, and patients.

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TABLE 1

Proposed research diagnostic criteria for NES

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- 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 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 in order 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, medical disorder, medication, or another psychiatric disorder.
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