Chapter 1

Introduction to Night Eating Syndrome

Past, Present, and Future

Jennifer D. Lundgren
Kelly C. Allison
Albert J. Stunkard

More than five decades have passed since the eating pattern now known as night eating syndrome (NES) was first recognized in the medical literature. Inarguably, NES is better understood now than it was in the 1950s, but in many ways our conceptualization, assessment, and treatment of NES is still in its infancy. We thought it was both timely and appropriate to provide the research and clinical communities with a comprehensive resource to help understand and treat NES better.

In preparing this book, our aim has been to help those who suffer from NES by providing the professional reader with the scientific knowledge base and clinical tools necessary to study and treat NES. As such, this book is written for the scientific and clinical communities, but most important, it is written to help those who suffer from NES.

Case Examples

Each of us has worked closely with individuals who have struggled to overcome their night eating. We are grateful to those whose personal

experiences with NES have informed our research and led to better assessment and treatment for this condition. Although everyone's story is different, those with NES often share similar core experiences. These case examples illustrate the impact that NES can have on people who suffer from it.

Lisa

Lisa presented self-referred for treatment of her NES. She also reported struggling with panic disorder. She is a 19-year-old single, Caucasian female who is currently a sophomore in college. Her parents are married, and she has one sister. All of her family members also struggle with some form of anxiety, including her sister, who has obsessive–compulsive disorder. Lisa reports a history of panic disorder since her sophomore year of high school. Last year, she "broke down" and finished the spring semester from home. She began taking a selective serotonin reuptake inhibitor (SSRI) to treat her anxiety, but she began waking up during the night with a "gnawing" feeling in her stomach, compelling her to eat. These nocturnal ingestions began once per night within the first 2 weeks of taking the SSRI, but increased to its current intensity of three to five each night as her dose increased. She discontinued the SSRI in September, but her night eating has continued.

Lisa returned to school this semester. She currently lives in a house with five female roommates. She has a single bedroom, which is next to the kitchen. She reports that she enjoys her current living situation.

Lisa reports that she reached her highest weight of 135 pounds at the age of 15. After that, she dropped down to 110 pounds. She did not receive treatment for anorexia, and she reports that she continued menstruating regularly. She does report having a history of "control issues" with eating. Her current weight at evaluation was 118.6 pounds. She stated that she is comfortable with her current weight, but is very worried that her night eating will increase her weight.

To deal with the anxiety about weight gain linked to her nocturnal ingestions, Lisa compensates with exercise. She works out for approximately 90 minutes per day, 7 days per week. These workouts include a variety of activities, including spin class, running on the treadmill, and other activities at the gym. She was up to running 13 miles, but she hurt her knee and was forced to modify her routine. She did not cut back on her overall time spent engaging in physical activity, despite this injury.

Lisa wakes most days at about 9:00 A.M. Her classes begin at about 10:30 A.M. When she wakes up, she is not hungry. She has a small break-

fast, typically a yogurt or oatmeal, sometime before noon. She next eats at about 3:00 P.M., when she eats a soup or salad or oatmeal or cereal. She often fits in her workout after classes. Dinner consists of sushi or a salad. She does not eat much meat, but prefers nuts, tofu, fish, and meal-replacement bars as her sources of protein. At night, she usually snacks just before going to bed to make sure she is full. She typically has some combination of peanut butter, popcorn, frozen yogurt, and whipped topping.

She goes to bed between 1:00 and 2:00 A.M. and it usually takes her about 30 minutes to fall asleep. Initial insomnia is a long-standing issue, and she has been taking an over-the-counter antihistamine to help her fall asleep. She wakes up about 1 hour after falling asleep and eats each time she is up, ranging from three to five times per night. She snacks on pretzels, peanut butter, cereal, and other foods that she has eaten during the day. Sometimes her portion is controlled, but if there is a specific food, such as birthday cake, in the house, she will eat through the majority of the cake in one night. When she is drinking alcohol, she wakes to eat more often and consumes much more food, such as a box of cereal. She typically drinks two to three times per week and has two to five drinks each time. She claims that the urge to eat during the night is overwhelming. Despite keeping flavored water in her bedroom, she is overcome by what she describes as a physical sensation of needing to eat and feels unable to stay in her room and resume sleep without eating. Overall, she meets criteria for NES, which is also supported by a score of 39 on the Night Eating Questionnaire (NEQ).

As stated above, Lisa has had a history of panic disorder since she was a sophomore in high school. Her first attempt at medication treatment was with an SSRI, but taking this medication coincided with her onset of NES, even though SSRIs have shown efficacy in treating NES in research studies. Lisa reports that she feels as though she is going to have a panic attack every day, but most days she can control them. She states that they come on out of the blue. She is curious about taking another medication to control them, but is wary of anti-anxiety medications, given her last experience.

Lisa has strong friendships and is involved in campus life. She does not have a boyfriend currently, but is dating. Her roommates are aware of her struggles with night eating and try to be supportive. She is wary of having a bed partner at this point because of her night eating. She drinks alcohol two to three times per week and engages in binge drinking on some of those occasions. She is aware that this exacerbates her nocturnal ingestions.

Lisa reports problems with acid reflux, for which she takes Prevacid.

She is also on an oral contraceptive. Finally, she is taking a 5-hydroxytryptophan supplement and an antihistamine to help with her mood and sleep. She is considering trying another SSRI to help with her panic and night eating symptoms.

Bridget

Bridget was referred for problems with NES as she prepared for bariatric surgery. She is twice divorced and is now living with her husband and stepson, who is a senior in high school. Her husband is supportive of her efforts, but she has had trouble controlling the type and amount of food in the house during their 3 years of marriage. Since then, she has gained almost 100 pounds.

Bridget reports a history of eating during the evening and night since childhood. She remembers that her mother and sister also had NES. Her father and brother did not. She reports that she has always functioned best at night, particularly from 10:00 P.M. to 1:00 A.M. She wakes to eat almost every night, usually between 1:30 and 2:00 A.M. Her initial thought is, "What's in the fridge?" She will go eat the particular food she is craving and subsequently is able to return to sleep quickly. Typical foods consumed during nocturnal ingestions include bread, cereal (one or two bowls), and ice cream.

Bridget believed she was overweight as a child, but looking at pictures, she realizes that she was not particularly overweight. She is active and has enjoyed exercise throughout her life. In her early to mid-30s, she was running marathons and was at a healthy weight. Her weight slowly increased after her activity was curtailed. She is currently at her highest weight, with a body mass index of 42 kg/m^2.

She has not exercised much recently. She complains that her weight interferes with her activity and contributes to her fatigue. After work she may drive to the gym, but then take a nap in her car instead of going in and exercising. She typically has difficulties with seasonal affective disorder (SAD), and she believes her fatigue in the late afternoon during the winter is worsened by this disorder.

Bridget wakes between 7:30 and 7:45 A.M. and is not at all hungry. She first eats between 11:00 A.M. and 1:00 P.M., when she will have a lunch of soup, bread, and coffee. She occasionally has an afternoon snack, for example a snack pack of Oreo cookies. After work she eats dinner at 7:30 P.M. A cook prepares her meals, which are nutritionally balanced. However, she reports eating very large portions. After dinners she continues eating leftovers, chips, and other available snacks. She

describes herself as restless, and part of her grazing behavior is spurred by this restlessness, as well as boredom in the evening. She eats just before going to bed, typically between 11:30 and midnight, to try to prevent nocturnal ingestions. She only occasionally experiences initial insomnia.

Between 1:30 and 2:00 A.M. she wakes with the urge to eat. Although she may use the bathroom at this time, the main reason for arousal is to seek food. Within 5 minutes of eating her preferred snack, she falls back to sleep. She is awake and aware during these nocturnal eating episodes. She repeats this behavior every night, once per night. Bridget has controlled this behavior in the past by keeping most foods out of the house. She believes that surgery will help her control her intake. Her stepson will be leaving for college in the fall, which will also help her limit foods that are brought into the house.

Bridget has a history of major depressive disorder (MDD), with her first episode in the early 1990s. She received psychotherapy and fluoxetine with some success. Her second episode of MDD occurred in the late 1990s, when she was diagnosed with melanoma. She was switched to escitalopram and has stayed on this medication at 10 mg per day. Her score of 7 on the Beck Depression Inventory–II indicates mild levels of depressed mood currently. Her medical practice with children with serious illnesses certainly contributes to her struggles with depression. She also reports symptoms consistent with SAD. She uses bright light therapy inconsistently to help these symptoms.

Bridget did not report significant anxiety symptoms, with a Beck Anxiety Inventory score of 4 and no previous anxiety diagnosis. However, she seemed anxious in the interview, with some pressured speech, stuttering, and perspiration. In addition, she describes feeling restless in the evenings when she is trying to relax with her husband. She is unable to sit still to watch her favorite television shows, which contributes to her evening grazing. Bridget has an extensive family history of mental illness. Her mother has bipolar disorder, and her sister has borderline personality disorder and MDD. Her sister is deceased, and Bridget suspects she committed suicide.

Bridget experiences cluster headaches. She takes Imitrex to help control these. She believes they are seasonal and coincide with her SAD. She also has high cholesterol, hypertension, and gastroesophageal reflux disease (GERD). These are also controlled by medications, and she hopes that the gastric bypass procedure will help reduce the signs and symptoms related to these diseases. She is also a cancer survivor of melanoma, which she suffered in the late 1990s.

Paul

Paul presented for treatment of his NES and for weight loss. He was referred by a sleep center. He is on many medications to manage his chronic neck pain, which have likely contributed to his weight gain and possibly influence his night eating symptoms.

Paul was a computer specialist when he developed serious and chronic neck pain more than a decade ago. He stopped working several years ago and has only been able to work part-time since then. Paul lives with his domestic partner, an adopted teenage son, a foster daughter, a dog, and a cat. His children present multiple challenges. These family issues, along with his pain, have created and maintain the high levels of chronic stress in his life.

Paul's pain has caused insomnia. About 3 years ago, he remembers starting to eat ice cream during the night to help ease the pain and likely to help soothe his stomach due to discomfort from his numerous medications. Since then, his nocturnal ingestions have steadily increased. He currently wakes to eat one to three times each night.

Paul reports maintaining a normal weight as a child and into early adulthood. He exercised frequently until his chronic neck pain began. He is now at his heaviest weight. Over the last 10 years he has been treated with several medications that are known to cause weight gain, which have interfered with his efforts to lose weight.

Currently, Paul wakes at about 7:30 each morning. He has a 40- to 60-minute commute to work. If he eats breakfast before driving, he has a yogurt, cereal, and juice. His morning snack typically consists of pretzels. Lunchtime is variable and can often be delayed until 2:00 P.M.. He has leftovers or purchases his lunch, such as sushi or a chicken sandwich. In the afternoon he has one to two cups of tapioca pudding or a cookie and milk. He typically walks the dog for 1 mile either before or after dinner. Dinner is usually between 7:00 and 8:00 P.M.. He and his partner cook nutritious meals. Paul avoids processed foods and attempts to eat fresh foods.

After dinner he reads, surfs the Internet, or takes care of household duties. He has between one to three snacks in the evening, which he usually feels compelled to eat. He consumes a snack just before going to bed in order to stave off the gnawing feeling he describes in his stomach, which he attributes to his nighttime medications, including Niaspan, Lexapro, oxycodone, Rozerem, and Benadryl. He goes to bed at 10:00 P.M., using a continuous positive airway pressure (CPAP) machine to treat his sleep apnea. About once per week he sleeps through the night, but typically he wakes between 1 to 2 hours after falling asleep. He feels hunger and believes that he cannot fall back to sleep unless he eats. He

describes it as an overwhelming, consuming feeling, as if it is "chemically driven." He consumes snacks such as tapioca, cookies, pie, ice cream, popcorn, and sometimes he cooks. He may eat in the kitchen or bring food up to the office while using the Internet. He repeats this up to three times each night. Paul's score of 34 on the NEQ meets the clinical cut score for NES, and he meets the diagnostic criteria for NES.

Paul has a long history of clinical depression. He has a therapist whom he sees with his partner to deal with his depression, cope with his pain, and to keep their relationship strong amid their many life stressors. He takes Lexapro (10 mg) and Cymbalta (60 mg, twice per day), as prescribed by his psychiatrist, to alleviate his depression. His score of 22 on the Beck Depression Inventory suggests a moderate level of depressive symptoms, consistent with his self-description. He has passive suicidal ideation, but no plan. His score of 2 on the Beck Anxiety Inventory suggests minimal anxiety symptoms currently. Paul works to keep his relationship strong. He leads a busy life despite his pain, although his level of activity exhausts him by the end of each day.

As these case examples illustrate, the core feature of NES, since its original description in 1955 (Stunkard, Grace, & Wolf, 1955), has been a circadian-delayed pattern of food intake, which manifests behaviorally as excessive food consumption in the evening relative to total daily food intake (i.e., evening hyperphagia) and/or waking at night and eating (i.e., nocturnal ingestion). As more people with nighttime eating problems have been studied, the definition of NES has developed. In March 2008, several eating and sleep researchers convened for the first International Symposium on NES. From this meeting came a comprehensive set of research diagnostic criteria for NES, which have been published in the *International Journal of Eating Disorders* (Allison et al., 2010) and are outlined in Table 1.1.

These criteria are a step in the right direction toward a comprehensive, evidence-based conceptualization of NES, but as several of the chapters in this book illustrate, much more research is necessary to validate these diagnostic criteria and to establish their clinical utility.

TABLE 1.1. Research Diagnostic Criteria for NES

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.

(*continued*)

TABLE 1.1. (*continued*)

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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A Guide to This Book

This book is designed to be a resource for both scientists and practitioners. In that regard, it both reviews the scientific knowledge base of NES and functions as a clinical tool box for treatment providers. The book is presented in six parts.

Part I. Introduction and History

• *History of NES.* Chapter 2 (Stunkard) reviews the original conceptualization of NES and chronicles its development through the recently introduced research diagnostic criteria (Allison et al., 2010) and proposal for inclusion in the forthcoming edition of the *Diagnostic and Statistical Manual of Mental Disorders* (DSM-5) as an eating disorder not otherwise specified (EDNOS; *www.dsm5.org*). In this chapter, Stunkard provides an account of his first clinical patients whom he diagnosed with NES.

Part II. Biology

• *Pathophysiological and neuroendocrine aspects of NES.* Recent advances in brain imaging techniques have contributed to a better under-

standing of neurotransmitter systems and brain areas associated with eating, sleep, and mood disturbance. Similarly, at least three neuroendocrine systems may be involved in NES: (1) the glucocorticoid system, because it is responsive to stress, (2) the melanocortin system because of its involvement in circadian rhythms, and (3) the serotonergic system, for which there is the most evidence. Chapter 3 (Ungredda, Gluck, & Geliebter) reviews the literature implicating these systems, and suggestions for future neuroendocrine and pathophysiological research are discussed.

• *Circadian rhythms associated with NES.* The most central feature of NES is the circadian-delayed food intake. As such, animal models of circadian-altered food intake and sleep–wake patterns may be useful in understanding the etiology of NES. Chapter 4 (Lundgren, Boston, & Noble) reviews the human and animal literature on circadian eating and sleeping patterns, including circadian neuroendocrine and eating patterns in persons with NES. New models for quantifying circadian eating patterns are presented.

• *Behavioral and molecular genetics of NES.* Genetic factors likely contribute to the development and maintenance of NES. Chapter 5 (Runfola, Root, & Bulik) reviews both the behavioral (family and twin studies) and molecular genetics literature on NES and other eating disorders and provides future directions for studies in this area.

Part III. Relation to Other Clinical Syndromes

• *Relationship of NES with obesity, bariatric surgery, and physical health.* Although NES was first described as a syndrome affecting obese individuals, the relationship of NES to obesity remains inconclusive. Chapter 6 (Colles & Dixon) reviews the sometimes contradictory literature on night eating and obesity. In addition, as more obese individuals seek bariatric surgery, the effect of night eating on treatment outcome and prognosis is an important clinical question. This chapter also reviews studies of NES in bariatric surgery populations and offers suggestions for health care providers who encounter patients with NES in bariatric surgery clinics. Finally, over the past decade researchers have begun to study the effect of NES on physical health, including metabolic syndrome, diabetes, and oral health. These findings are reviewed and suggestions for improving research on the health implications of NES are presented.

• *NES and other eating disorders.* Recent research in both the United States and abroad has found high rates of night eating behavior among patients with other eating disorders (anorexia nervosa, bulimia

nervosa, and binge-eating disorder). The relationship of NES to other eating disorders, especially within the context of proposed changes in DSM-5, are reviewed in Chapter 7 (Latzer & Tzischinsky).

• *NES and other psychiatric disorders.* Night eating has long been associated with psychiatric comorbidity. Chapter 8 (Rempfer & Murphy) reviews the literature, finding high rates of NES among psychiatric samples and high rates of psychiatric disorders among persons with NES. Potential reasons for the high rates of comorbidity are discussed.

• *Nocturnal eating and sleep disorders.* In characterizing, assessing, and treating NES, it is crucial to understand its relationship to sleep and movement disorders such as the parasomnia, sleep-related eating disorder. Chapter 9 (Howell & Crow) describes the differences and similarities between NES and other sleep and movement disorders, and suggestions are made made for future research to understand better the relationships among these disorders.

Part IV. Assessment

• *Conceptual issues in the assessment of eating behavior, mood, and sleep in NES.* The primary behavioral feature of NES is a delay in the circadian intake of food. Sleep and mood disturbance are other key features of NES. As the field moves forward, it is essential that the assessment of food, sleep, and mood be valid and reliable. Chapter 10 (Anderson, Engel, & Crosby) introduces the reader to common challenges in the assessment of eating, sleep, and mood in the context of NES and offers strategies for effective assessment practices in both research and clinical settings.

• *Assessment instruments for NES.* Several assessment tools have been developed specifically to assess the symptoms of and to make a diagnosis of NES. These include the NEQ, the Night Eating Syndrome History and Inventory (NESHI), and the Night Eating Diagnostic Questionnaire (NEDQ), and portions of the Eating Disorder Examination (EDE). Chapter 11 (Lundgren, Allison, Vinai, & Gluck) describes the currently available NES assessment instruments, with particular emphasis on the NESHI, a semistructured interview that assesses the history of and current eating, sleep, and mood patterns in the context of NES.

Part V. Treatment

• *Pharmacological treatment of NES.* Pharmacotherapy is the most commonly reported treatment for NES in the literature. The most prom-

ising agents are SSRIs, but other agents (e.g., topiramate) can be used successfully, as reported in case studies. Chapter 12 (Patel, O'Reardon, & Cristancho) critically reviews the evidence base for pharmacological interventions, offering researchers suggestions for further study and offering clinicians an evidence-based starting place for treating NES.

- *Psychotherapy/cognitive-behavioral therapy for NES.* Pharmacotherapy is not the only treatment option for NES, and psychotherapy (as it is for other eating and sleep disorders) is an important part of a comprehensive approach to the treatment of NES. Chapter 13 (Allison) reviews the conceptual background for the use of cognitive-behavioral therapy (CBT) in the treatment of NES, as well as empirical evidence for its efficacy.

- *Cognitive-behavioral treatment manual for NES.* Chapter 14 (Allison) presents a detailed CBT treatment manual for NES, developed by the author and her colleagues at the University of Pennsylvania.

- *Other approaches in treatment of NES.* Chapter 15 (Pawlow) reviews the evidence for alternative approaches to the treatment of NES, including relaxation and stress management, phototherapy, and behavioral weight loss.

In summary, we hope that readers of this book find the material informative and use it to advance future research and clinical efforts, with the ultimate goal of helping those who suffer from NES and related conditions.

References

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