

Review

Night Eating Syndrome: A Review of Etiology, Assessment, and Suggestions for Clinical Treatment

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Abstract: Night Eating Syndrome (NES) is a distinct eating disorder characterized by recurrent episodes of night eating, either through excessive food consumption after the evening meal or eating after awakening from sleep. Despite its recognition, there remains a dearth of research on NES, limiting our understanding of its etiology, prevalence, diagnosis, and treatment. This paper conducts a narrative review spanning a wide spectrum of studies focusing on the etiology, assessment, and clinical treatment strategies of NES. This review traces the historical evolution of NES definitions, distinguishes NES from obesity-related eating behaviors and other eating disorders, explores the psychological determinants of NES, and discusses existing therapeutic options. This review highlights the complex etiology of NES, influenced by circadian rhythms, hormonal changes, psychological distress, and personality traits. It emphasizes the need for reliable assessment tools and a holistic approach to treatment, considering the high comorbidity of NES with other psychiatric and medical conditions. Current treatment options, such as cognitive behavioral therapy and pharmacotherapy, show promise but require further research for refinement. NES remains underdiagnosed and undertreated, with challenges including unclear diagnostic criteria, comorbidities, and lack of evidence-based treatments. Future research should focus on developing reliable assessment tools, exploring etiology, comparing treatment approaches, and considering prevention strategies, utilizing diverse and representative samples to advance our understanding and improve clinical care.



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Keywords: night eating syndrome; emotion regulation; neuroticism; psychological distress; maladaptive coping strategies; eating disorders; clinical psychology; behavioral addiction; cognitive behavioral therapies; rumination

1. Introduction

The Night Eating Syndrome (NES) was first described in 1955 by Albert Stunkard as a disorder characterized by morning anorexia, evening hyperphagia, and insomnia [1] (see Table 1). In 2010, Allison and colleagues [2] proposed diagnostic criteria for NES in the absence of clear identification in the DSM IV-TR. Key criteria include consuming over 25% of daily calories after dinner or having at least two night eating episodes per week. Patients must recall and describe the night eating events. They must also show at least three of the following: frequent morning anorexia, urge to eat between dinner and sleep or during the night, insomnia, belief that eating aids sleep, and mood that worsens in the evening. The disorder, causing significant distress and reduced daily efficiency, must have lasted at least three months and not be due to substance abuse, diseases, medication, or other psychiatric disorders.

For the first time, NES was officially included in the DSM-5 among the Other Specified Feeding or Eating Disorder (OSFED) [3,4]. NES is quite common, affecting 1.1–1.5% of the population, of which a range of 6–16% suffers from obesity [5,6], and a range varying from

5 to 44% suffers from eating disorders. This data are not considered fully representative as patients suffering from this syndrome often do not seek help, worried about the judgment and shame that still surrounds the knowledge of this phenomenon. Those who eat after dinner or during night awakenings are aware of having done so and have a clear memory of it.

Table 1. Historical overview of the evolving definitions and additions to the concept of Night Eating Syndrome (NES) by various authors.

Year	Author(s)	NES Symptomatology
1955	Stunkard et al. [1]	Evening hyperphagia, nocturnal eating, morning anorexia, insomnia, mood worsening in evening
1986	Kuldau and Rand [7]	Evening hyperphagia, morning anorexia, insomnia, <i>emotional distress</i>
1996	Stunkard et al. [6]	Evening hyperphagia, morning anorexia, <i>Binge Eating Disorder</i> , 'sleep onset', 'medial' insomnia
1999	Birketvedt et al. [8]	Evening hyperphagia, morning anorexia, insomnia, <i>mood and neuroendocrine disturbances</i>
2005	Allison et al. [9]	Evening hyperphagia, <i>awakenings</i> , morning anorexia, mood disturbances, <i>disrupted sleep patterns</i>
2006	Allison et al. [10]	Evening hyperphagia, awakenings, morning anorexia, mood and sleep disturbances
2010	Allison et al. [2]	Evening hyperphagia, <i>awakenings with ingestion, awareness and recall, frequency (at least three times a week)</i>

Note: The symptoms written in italics indicate differences to previous definitions. In the latest DSM-5-TR, NES has been included in the category of Nutrition and Eating Disorders, which are defined as "persistent disturbances of eating or eating-related behaviors that result in altered consumption or absorption of food and that significantly damage physical health or psychosocial functioning" [11]. As a diagnostic category, it falls under the specification of Nutrition or Eating Disorder.

Its definition is as follows: NES is characterized by recurrent episodes of night eating, manifested by eating after awakening from sleep or excessive food consumption after the evening meal. There is only awareness and memory of having eaten. Night eating is not better explained by external influences such as the individual's sleep-wake cycle modification or local social norms. Night eating causes significant discomfort and/or impairment of functioning. The patterns of disordered eating are not better explained by binge-eating disorder or another mental disorder, including substance use, and are not attributable to another medical disorder or the effect of drugs [11].

Aim of the Review

This review is dedicated to a thorough examination of Night Eating Syndrome. It begins by defining NES and tracing its characterization through time, as interpreted by various authors and developments. The review then differentiates NES at the point of diagnosis from other eating and sleep-related disorders. It delves into the psychophysiological and psychopathological correlates of NES, thereby offering a contemporary synopsis of the existing literature while highlighting areas that future studies could address. Despite its recognition as a distinct eating disorder, there remains a dearth of research on NES. Existing studies often rely on small, non-representative samples or case reports, limiting our understanding of its etiology, prevalence, diagnosis, and treatment. For example, while the link between NES and sexology is not explicitly mentioned in the literature, it is important to note that NES can develop in individuals who have anxiety, depression, or obesity [12], conditions that can also impact sexual health and behavior. Furthermore, the high comorbidity between NES and other eating disorders, as well as its association with sleep correlates and distress across cultures, underscores the complexity of this condition and the need for a comprehensive approach to treatment [13,14]. The lack of consensus on diagnostic criteria poses a significant hurdle, with different definitions and measures

being used, making cross-study comparisons difficult. Additionally, the absence of validated instruments for screening and monitoring NES further complicates research efforts. Evidence-based treatments for NES are scarce, and rigorous, large-scale trials are needed to evaluate treatment efficacy and safety. The overarching goal of this review is to provide an exhaustive analysis of NES, encompassing its definition, diagnosis, differentiation from other disorders, and potential treatment options, while also addressing the current limitations in the literature. It is committed to understanding the psychophysiological and psychopathological correlates of NES and assessing its impact on individuals. This comprehensive approach aims to contribute to the existing body of knowledge on NES and guide future research in this field.

2. Methodology

Our scope encompasses a broad spectrum of the literature, focusing on the disorder's etiology, assessment, and clinical treatment strategies. Our search strategy involved scouring databases (e.g., Google Scholar, PubMed, EMBASE, and Web of Science) and employing specific keywords related to NES (e.g., "Night Eating Syndrome" OR "NES", "Obesity" AND "eating disorders", "Psychological Distress" AND "Night Eating Syndrome", "Emotion Regulation" AND "Coping Strategies" AND "NES"), ensuring a thorough examination of relevant studies. Despite our rigorous search strategy, there is a possibility that some relevant studies may have been overlooked. We selected studies prioritizing peer-reviewed articles that offer valuable insights into NES. The screening process involved an initial review of titles and abstracts followed by a detailed analysis of the full texts. This two-tiered approach ensured that only the most pertinent studies were included in our review. Data extraction was carried out with precision, with a focus on definitions, interventions, and outcomes. Finally, we synthesized the findings through a narrative review approach, weaving together the diverse strands of research to present a coherent and informative overview of NES.

Research Question

The central research question of this paper is "What is the etiology, assessment, and clinical treatment of Night Eating Syndrome, and how can we further understand it through a comprehensive analysis?". This paper aims to dissect NES by scrutinizing its definition, diagnosis, and how it stands apart from other eating and sleep-related disorders. We delve into the psychophysiological and psychopathological aspects of NES, exploring factors such as circadian rhythms, hormonal influences, depression, anxiety, substance abuse, emotion regulation, rumination, neuroticism, and coping strategies. We also examine the current treatment modalities for NES, emphasizing the necessity for additional research to fill the gaps in our understanding, particularly in the areas of NES's etiology, assessment, and intervention.

Our inquiry is bolstered by a thorough review of the literature, tracing the historical evolution of NES definitions, its recognition in diagnostic manuals, and the diverse psychological and physiological factors linked to the syndrome. We highlight the critical need to address NES in clinical practice and suggest potential avenues for future research, a need that is emphasized by the literature to date [15,16].

3. Circadian and Hormonal Influences on Night Eating Syndrome

3.1. Circadian Rhythms

The biological rhythm known as the circadian rhythm, controlled by the internal biological clock, regulates various aspects of our daily life, such as body temperature, wakefulness, appetite, and hormone secretion. Studies conducted by Stunkard in 2009 have shown that in subjects with NES, there is a delay in the secretion of Leptin, Ghrelin, and Cortisol, which play a crucial role in controlling appetite, satiety, and sleep [17]. The dysregulation of the sleep-wake rhythm and appetite in subjects affected by NES leads to a high caloric intake in the evening/night, compromising sleep quality and reducing

appetite during the day. This state of prolonged fasting stimulates food intake during the night, a feeding behavior known as nocturnal eating [17].

3.2. Hormonal Influences

From a neurobiological point of view, it has been observed that subjects affected by chronic stress and with high levels of cortisol, in front of a food stimulus, tend to consume a greater amount of food compared to non-stressed subjects. Cortisol, a hormone mobilized in response to stress, plays a crucial role in regulating the use of dietary nutrients by increasing gluconeogenesis and lipolysis in adipose tissue [18]. This physiological response can lead to an increase in food intake, particularly in individuals with high cortisol reactivity. A study conducted on individuals with obesity and those of a healthy weight found that obese participants with high cortisol reactivity consumed significantly more food than their counterparts with low cortisol reactivity [19]. This finding aligns with numerous studies indicating that physical or emotional distress can lead to increased intake of foods high in fat, sugar, or both [20]. The relationship between cortisol, leptin, and melatonin during the night shows a decrease in the levels of melatonin and leptin, which favor sleep and inhibit hunger, and an increase in cortisol, which increases the sensation of hunger and reduces sleep.

4. Psychological Factors in Night Eating Syndrome

4.1. Depression, Anxiety Disorders, and Substance Abuse

Research has consistently demonstrated a high comorbidity between NES and other psychopathologies, particularly depression, anxiety disorders, and substance abuse [21]. This comorbidity is not unique to NES but is also prevalent in other eating disorders. A review in the *Journal of Eating Disorders* found that the most prevalent psychiatric comorbidities in eating disorders were anxiety (up to 62%), mood disorders such as depression (up to 54%), and substance use and post-traumatic stress disorders (up to 27%) [22]. Furthermore, an article in *Current Obesity Reports* underscored the high comorbidity between NES and other eating disorders, adding complexities for patients with comorbid eating disorders [13]. This suggests that individuals with NES often struggle with other eating disorders, which can complicate their treatment and recovery process. It is important to note that these comorbidities can exacerbate the symptoms of NES, making it more difficult for these individuals to maintain healthy eating habits and sleep patterns [13].

In addition to eating disorders, NES is also frequently comorbid with anxiety disorders and alcohol use disorders. A study in the *Journal of Dual Diagnosis* discussed the co-occurrence of these conditions, which is relatively common and associated with a complex clinical presentation [23]. This complexity arises from the interplay between the symptoms of anxiety, alcohol use, and NES, which can mutually reinforce each other, leading to a vicious cycle that is hard to break [23]. Studies conducted on patients affected by Night Eating Syndrome have also found a high comorbidity with other psychopathologies, specifically with depression but also with anxiety disorders and substance abuse [22,24].

4.2. Emotion Regulation

Emotion regulation refers to the set of automatic or voluntary processes that involve the activation, maintenance, modification, and, more generally, the conscious or unconscious modulation of one's emotional experiences, in order to respond to environmental demands [25,26]. An individual's inability to recognize and modulate their emotions through more adaptive modes would lead to the establishment of a tendency to discharge tension and attenuate arousal caused by unpleasant emotional states, through impulsive gestures or behaviors that could degenerate into an eating disorder.

The concept of emotion regulation refers to each person's ability to

- Accept and be aware of their own emotions;
- Stay focused on their own goals and inhibit impulsive behaviors when negative emotions arise;

- Use strategies appropriate to the situation to modulate the intensity and/or duration of emotional experiences;
- Be willing to experience and integrate negative emotions within oneself and live them as a significant part of life [27].

A problem in one of these areas may indicate a deficit in emotion regulation that can favor the use of dysfunctional coping strategies. This deficit can be induced by several factors, including the way emotions are experienced (for example, negativity), the intensity and frequency of a person's reaction to environmental stimuli (for example, emotional reactivity [28]) and the way distress can be tolerated and managed when experienced [29].

Over the years, various theoretical conceptualizations of emotion regulation have been proposed, from Gross's model [30] that describes emotions in a processual and dynamic way, later expanded into a more extensive model that considered emotion regulation as an evaluative process divided into three phases [31]. Initially, there is the identification of the situation, then the selection of the regulation strategy that is then activated. If the latter proves to be effective, it will be reused consistently. Good emotion regulation allows for good health outcomes, relational and work well-being; its impairment has been correlated with the risk of suffering from mental disorders, including eating disorders [32]. Resorting to binges or restrictions are maladaptive coping strategies of avoidance or suppression of negative emotions that are not identified and addressed functionally [33]. The inability to identify and regulate emotions correctly, or alexithymia, are elements that involve the entire spectrum of eating disorders [34]. In emotion regulation, the sphere of impulse control generates different subtypes of eating disorders [3]. Bulimic patients have greater difficulty in regulating behavior and use impulsive binges to cope with negative effects, a useful strategy in the short term, a characteristic not present among patients with restrictive anorexia [35,36].

4.3. Emotion Regulation and Eating Pathology

Preft and colleagues [37] conducted a meta-analysis to investigate the association between emotional regulation and eating pathology, including 96 studies. Studies on eating disorders have shown that the use of adaptive strategies to modulate effective states is essential for symptom management and the improvement of patients' psychological well-being. Awareness of one's emotions, emotional clarity, acceptance of one's sensations, and the ability to solve emotional problems are all strategies that can help cope with the mechanisms underlying eating disorders. On the other hand, maladaptive strategies such as emotional avoidance and suppression of emotions can contribute to the maintenance of symptoms and complicate the healing process [38]. Instead of facing their emotions and trying to understand them, those suffering from eating disorders tend to avoid or repress them, increasing the risk of relapses and worsening psychological conditions.

Therefore, it is essential that patients affected by eating disorders learn to use adaptive strategies to manage their emotions in a healthy and constructive way, thus promoting the healing process and achieving lasting psychological well-being [39]. This suggests that maladaptive emotional regulation strategies could be a risk factor for the development of eating disorders, but they are not necessarily the initial cause. Furthermore, the fact that such strategies are also present in non-clinical samples suggests that they may be more widespread in the general population than previously thought.

4.4. Emotional Variations and Interpersonal Relationships

NES can be influenced by emotional variations and interpersonal relationships [40]. For instance, consider an individual living in a high-stress family environment. This stress could be due to external factors, such as unemployment or war, or internal factors, such as death or divorce [41]. The family's equilibrium is disturbed, leading to increased conflict and lowered performance in family roles and tasks [41]. In this context, the individual might develop NES as a coping mechanism for the familial stress. The late-night eating episodes provide temporary relief from the emotional turmoil, but they disrupt

the individual's circadian rhythm and lead to further distress [13]. The individual might also experience feelings of guilt or shame associated with their eating habits, which can exacerbate the stress and perpetuate the cycle of NES [40]. Moreover, societal stressors, such as cultural assimilation, can also contribute to the development of NES [42]. For example, an immigrant might struggle with adapting to a new culture and its dietary habits. The stress and anxiety associated with this cultural transition might lead to the development of NES as a form of self-soothing [42].

4.5. Rumination

It is possible that rumination may be considered a maintenance mechanism of eating disorders, as it contributes to increasing anxiety and stress related to food and body weight, fueling a vicious cycle of negative thoughts and dysfunctional behaviors [43]. It is therefore important to consider rumination as a central element to address in the treatment of eating disorders, working not only on emotion management and body acceptance, but also on reducing obsessive thoughts related to food and weight. In this sense, cognitive and behavioral therapies can be fundamental to help patients break the cycle of rumination and adopt more functional strategies to cope with their concerns. Moreover, it is important to consider that rumination does not only concern food and body weight but can also manifest in other areas of life of patients with eating disorders, contributing to fuel a negative and self-destructive thought pattern [44,45]. Therefore, a therapeutic approach that considers rumination as a central mechanism of eating disorders can lead to more effective results in the treatment of such pathologies, contributing to improving the quality of life of patients and promoting a healthier relationship with food and their own body.

4.6. Personality Traits

Neuroticism, a personality trait characterized by a prevalence of negative emotions, insecurity, and vulnerability [46], has been positively associated with the symptomatology connected to eating disorders [47], as well as a predisposing factor for them [48]. This association has been increasingly indicated by a number of systematic reviews [49]. These reviews suggest that mental health problems such as depression, social anxiety, and ADHD are more prevalent among people suffering from eating disorders [49]. Neuroticism, in particular, has been found to be associated with anorexia readiness syndrome (ARS) in women [50]. However, no empirical study has examined the possible relationship between neuroticism and night eating. Based on systematic reviews, it can be hypothesized that neuroticism is a predictor of night binges.

Impulsivity is another personality trait that has been linked to eating disorders. Impulsive personality traits are established predictors of engagement in a range of risky behaviors [51]. Impulsive urgency, a facet of impulsivity, has emerged as a predictor of alcohol and substance misuse, suicidality, non-suicidal self-injury (NSSI), and disordered eating [52]. In the context of NES, it can be postulated that individuals with higher levels of impulsivity may be more prone to night binges. This is because impulsivity often leads to a lack of self-control, which could potentially result in overeating or binge eating during the night. However, this is a hypothesis that requires further empirical investigation [51].

4.7. Personality Disorders

Research has shown a significant correlation between personality disorders, such as Borderline Personality Disorder (BPD), and eating disorders [49,53]. A study published in the *Journal of Eating Disorders* found a prevalence of 65.4% of feeding and eating disorders (FEDs) among patients with BPD [53]. The highest prevalence rates were reported for other specified feeding and eating disorders (51.3%) and the lowest for bulimia nervosa (6.9%) [53]. The study also suggested that alexithymia, anxiety, and depression should receive clinical attention as potential therapeutic targets in the comorbidity of BPD and FEDs [53].

While the specific link between BPD and NES is not explicitly mentioned in these articles, the high prevalence of eating disorders among patients with BPD and the comorbidity of NES with other eating disorders suggest a potential overlap. The relationship between BPD and NES is complex and multifaceted, involving factors such as alexithymia (difficulty recognizing and talking about emotions), anxiety, and depression [53]. These factors should receive clinical attention as potential therapeutic targets in the comorbidity of BPD and FEDs, including NES [53].

4.8. Psychological Distress

According to the study of He and colleagues [54], there is also a close relationship between night eating and psychological distress, a condition that can lead to the presence of depressive and/or anxious symptoms [55]. In fact, patients affected by night eating syndrome reported the onset of this condition, following extremely stressful life events [56]. This condition produced an excess of neurotransmitters such as cortisol, insulin, ghrelin, and leptin that influenced the ways of food intake [57]. Moreover, stress can also alter the reward activation system, diverting attention in the search for “comfort” foods, very appetizing, rich in fats [58]. To overcome it, coping strategies are activated as a defense mechanism, which if not well managed, end up obtaining the effect of maintaining or reinforcing negative emotions and physical sensations [59].

Some authors found that university students, who have high levels of stress, are more likely to implement night eating behaviors, due to dysfunctional coping strategies [60]. All this has led us to hypothesize that there may be a relationship between neuroticism and night eating, mediated by psychological distress and maladaptive coping strategies. To demonstrate this hypothesis, a study was conducted on 578 university students, to whom the Revised Eysenck Personality Questionnaire Short Scale [61] was administered to investigate the neurotic trait and the Night Eating Questionnaire [62] for the Night Eating Syndrome. Regarding psychological distress and maladaptive coping strategies, the Depression Anxiety Stress Scale [63] and the Simple Coping Style Questionnaire [64] were used. From this study, a positive relationship emerged between neuroticism and night binges mediated by psychological distress, but not by maladaptive coping.

Therefore, considerable mood variability and increased insecurity, typical traits of neuroticism, put the subject at greater risk of developing inadequate eating behaviors, including night binges. Psychological distress represents a significant variable but needs further studies to verify the presence of other factors that can mediate the association between neuroticism and NES. Neuroticism remains a warning signal regarding the possible development of this syndrome.

4.9. Comorbid Conditions

NES is often associated with a range of comorbid conditions, including other eating disorders, sleep disorders, and affective disorders such as bipolar I and II disorders [22,65]. For instance, NES is sometimes comorbid with excess weight; as many as 28% of individuals seeking gastric bypass surgery were found to have NES [66]. Moreover, NES is associated with many physical comorbidities, especially metabolic diseases, and psychological comorbidities like depressive symptoms, chronic social stress, and high psychological distress [67].

Eating disorders in general are associated with high psychiatric and medical comorbidity rates [22]. The most prevalent psychiatric comorbidities are anxiety (up to 62%), mood (up to 54%) and substance use and post-traumatic stress disorders (similar comorbidity rates up to 27%) [22]. Medical comorbidities can precede, occur alongside or emerge as a complication of the eating disorder [22].

Sleep disorders are also associated with a significant increased risk of heart disease, high blood pressure, obesity, diabetes, anxiety and depression, substance abuse, certain types of cancer, automobile crashes, on-the-job accidents, and total mortality along with impaired work productivity, academic performance, and reduced quality of life [68].

Bipolar I and II disorders are highly prevalent and heterogeneous. Their increasing complexity is often caused by the presence of comorbid conditions, which have become the rule rather than the exception [69]. Comorbid substance use disorder (SUD) was found to exist in 61% of patients with bipolar I disorder and in 48% of bipolar II patients [69].

4.10. Patient Perspectives on Living with Night Eating Syndrome

Those who experience NES describe a circadian delay in food intake, with at least 25% of daily food intake ingested after the evening meal and/or nocturnal awakenings with food ingestion at least two times per week [13]. They often report a lack of desire to eat in the morning, a strong urge to eat between dinner and bedtime, sleep-onset and/or sleep maintenance insomnia, a belief that one must eat in order to sleep, and a depressed or worsening mood in the evening [13].

Furthermore, there are narratives and personal experiences available in the gray literature about living with NES. A study titled “The Dark and Comforting Side of Night Eating: Women’s Experiences of Trauma” provides insights into the experiences of patients with NES [70]. The study conducted semi-structured interviews with 18 women (aged 19–60) diagnosed with NES. The analysis raised two themes:

1. The darker side of NES: This theme represents the darker sides of patients’ behaviors and involves feelings of helplessness, contempt, self-loathing, and a loss of control. Patients also related to difficult memories concerning sexual, physical, and emotional abuse.
2. The comforting side of NES: This theme involves soothing, regulating, emotional disconnecting, and a sense of calm, control, and the ability to function.

These findings present the relationship between traumatic life events, dissociation, and eating disorders. Clinically, they highlight the importance of an early assessment and a traumatic life history and suggest giving special treatment attention to the role of dissociation and night eating as regulatory mechanisms in the therapeutic process and alliance [70]. However, it is important to note that these experiences can vary greatly among individuals.

5. Differential Diagnosis

5.1. Night Eating Syndrome and Obesity-Related Eating Behaviors

Obesity is associated with mental disorders such as Binge Eating Disorder (BED), NES, Generalized Anxiety Disorder (GAD), and Major Depressive Disorder (MDD). NES and obesity-related eating behaviors are both associated with increased body mass index (BMI) and can contribute to weight gain [71,72]. However, they are distinct in their characteristics and impacts on individuals.

NES is characterized by recurrent episodes of night eating, evident through excessive food consumption after the evening meal or eating after awakening from sleep [71]. Interestingly, a study found that there was a significant positive predictive relationship between night eating and BMI when individuals had a high emotional eating score [73].

On the other hand, obesity-related eating behaviors often involve overeating throughout the day, not just at night [12]. These behaviors can be influenced by a variety of factors, including emotional eating, loss of control eating, and body-related concerns [72]. BED, an obesity-related eating disorder, can be differentiated from NES by the higher occurrence of emotional eating, body-related concerns, and abnormal eating episodes [72]. While both NES and obesity-related eating behaviors can contribute to weight gain and increased BMI, they are distinct in their characteristics and impacts on individuals [71,72].

Regarding the incidence of NES among obese subjects, statistical analysis shows a prevalence of NES of 13.53% [74]. However, in obese patients, there is no daytime anorexia, but there is a more frequent association with binge behavior. The meaning of this association requires further studies aimed at better defining the psychopathological picture of NES. The behavior adopted is not considered a consequence of a direct effect of external ascendants

such as the variation in the sleep–wake phase, or of social canons used. Despite this, the person perceives real discomfort, which will compromise normal daily life.

NES differs from other eating disorders such as Anorexia Nervosa (AN), BED, and Bulimia Nervosa (BN); although, a prevalence of NES among those who suffer from it has been estimated to oscillate between 5 and 44% [6].

5.2. Night Eating Syndrome (NES) and Binge Eating Disorder (BED)

In Binge Eating Disorder, it is possible that there are nighttime awakenings with food intake, but these are not as characteristic as in NES. Moreover, the amount of food consumed during binges is significantly greater than that consumed in NES episodes [75]. The characteristics that differentiate it include a decrease in daytime food towards nighttime seeking, and the absence of phenomena such as provoked vomiting, the intake of laxatives, and sleep dysfunction. It also stands out for a different dietary pattern where there is a specific preference for carbohydrates (see Table 2).

Table 2. Main differences between BED and NES [6].

Items	BED	NES
Amount of food intake	Large (>1300 kcal)	Modest (271 kcal)
Periodicity	No	Yes
Familiarity	No	Yes
Population	1.8–3.4%	1.5%
Obesity clinics	8.9–18.8%	8.9–15%
Morbid obesity	27–47%	7.9–42%
Major depression	37–51%	44%
Any substance abuse	12–72%	25%
Any Axis I disorder	28–60%	77%
Personality disorders	20–35%	-

In Night Eating Syndrome, we find these characteristics:

- The impulsivity related to food intake in the evening.
- The need to contain the present anxiety using food in a compensatory way.
- The development of sleep-related rituals.
- The desire for food, which takes on the characteristics of a real craving. Craving is an uncontrollable desire for food intake that is not subject to any form of control by the individual.

The way in which the intake of food takes place is an important cause of low self-esteem. Food takes on the function of a compensatory object with respect to the perception of internal conflicts, through which Internal Operating Models are activated aimed at achieving a state of well-being. Eating is not the answer to a perception of physiological hunger but rather a more complex psychic condition linked to the concept of voracity, aimed at returning to a symbiotic condition [76,77]. The food object from a psychopathological point of view is used as an anxiolytic with respect to internal states such as anger and desire or as a good object in case of emotions such as envy and hatred, where there is a distancing or ambivalent dynamic with one's caregiver [78,79]. NES, we have seen, affects about 1.5% of the population with onset in early adulthood, then stabilizes for a long period and reappears in particularly stressful periods [1]. When the motivations in patients affected by this syndrome were investigated, it emerged that the sensation of hunger mainly occurs in the evening and nighttime because it was the only one considered serene and peaceful. Food is therefore used as a vent that fills moments of silence without allowing oneself to reach a correct state of relaxation. Nourishment is used as a solution to cope with stress, pain, even depressive states with the risk of making it assume over time the role of an addiction [56].

5.3. Night Eating Syndrome (NES), Sleep Eating Disorders (SRED), and Night Sleep-Related Eating Disorder (NS-RED)

In NES, the part related to sleep must also be taken into consideration, as insomnia or sleep disorders can precede this syndrome or be the cause or trigger of sleep difficulties. Several studies have been produced that have investigated the correlations [80,81].

NES is characterized by recurrent episodes of night eating, either through excessive food consumption after the evening meal or eating after awakening from sleep [4]. The state of consciousness during nocturnal eating is a major distinction between NES and other sleep disorders [4]. In NES, individuals are fully aware and recall the nocturnal eating episode [4], unlike in some sleep disorders where individuals may not be conscious or have memory of their actions [4,13]. Moreover, other sleep disorders may present with different symptoms and impacts on sleep patterns. For instance, a sleep-related eating disorder (SRED) is another condition that involves abnormal association between eating and sleep [82]. However, it differs from NES in that individuals with SRED often have no memory of their eating episodes [82]. Specifically, SREDS are characterized by food intake in the first 3 h after falling asleep with partial awakening and, therefore, in a non-ordinary state of consciousness [83]. Primary Sleep Disorders generally have different causes attributable to the presence of major psychiatric diseases (states of psychomotor agitation, sleepwalking) to the presence of organic diseases that cause sleep interruption such as sleep apnea syndrome, periodic limb movement disorder [84,85].

In the observation of these sleep disorders, it has been seen that it is not always associated with an eating disorder and even in the presence of the same, the state of awareness is different (e.g., in the case of sleepwalking, food intake is not carried out consciously unlike those who suffer from NES) [86]. The presence of nighttime awakenings or difficulty falling asleep without eating has led researchers to investigate the function of sleep. It has emerged that there is a need to distinguish NES from primarily sleep disorders, such as Night Sleep-Related Eating Disorder (NS-RED), which cause early or intermittent awakenings and difficulty falling asleep followed by food intake [4,71].

NS-RED is a nighttime sleep disorder that is associated with an eating behavior disorder. People affected by NS-RED may have episodes of eating during the night in a state of total or partial unconsciousness, during which they eat foods they would not normally consume [13]. People with NES are fully aware during their episodes of night eating and usually consciously choose what to eat [6]. It is rare that they do not remember what they ate during these episodes, and this forgetfulness is not related to problems of consciousness. A comparison between the main differences between NES and NS-RED may be found in Table 3.

Table 3. Main differences between NES and NS-RED [56].

Features	NES	NS-RED
State of consciousness	Yes	No
Amnesia about what was eaten	No	Yes
Associated somnambulism	No	Yes
Intake of unusual foods or non-foods	No	Yes
Depressed mood	Yes	No
Evening feeding	Yes	No

6. Discussion

6.1. Considerations for Implementing Treatment for Night Eating Syndrome

We suggest that the goal of a treatment could be to reduce daytime and nighttime binge eating through emotional and eating regulation. The interventions that are most often used are part of the Fairburn protocol techniques [87,88] within cognitive psychotherapy, such as psychoeducation on eating disorders, nutritional rebalancing through a food diary and ABCs with respect to binge eating, and validation of the disorder. Next, we focus on inner dialogue and critical remorse in relation to the eating disorder and overall functioning. In

treatment with the Fairburn protocol, we focus on managing eating restriction, organizing sleep and wakefulness, and understanding one's emotional states through ABC counseling. We also delve into the crucial role that low self-esteem and emotional dysregulation play in perpetuating eating disorders.

From a neurobiological point of view, it could be observed through photovisualization experiments with subjects with chronic stress associated with high cortisol levels; in the presence of a food stimulus, they took in greater amounts of food than non-stressed subjects. Specifically, Birketvedt [89] pointed out that the response of ACT (adrenocorticotrophic hormone) and Cortisol to CRH corticotropin releasing hormone is dampened in those in whom NES was present, compared to controls. This hypothesis suggests that the body, when subjected to chronic stress, continues to overproduce cortisol to cope with the situation. This overactivation of the Hypothalamus Pituitary Adrenal (HPA) axis may lead to the depletion of the adrenal glands and thus the depletion of the axis itself [90]. The HPA axis is a complex system of neuroendocrine pathways and feedback loops that function to maintain physiological homeostasis [91]. Abnormal development or overactivation of the HPA axis can result in long-term alterations in neuropeptide and neurotransmitter synthesis in the central nervous system, as well as glucocorticoid hormone synthesis in the periphery. These changes can potentially lead to a disruption in neuroendocrine, behavioral, autonomic, and metabolic functions [91].

Depletion of the Hypothalamus Pituitary Adrenal axis can manifest with symptoms such as chronic fatigue, sleep disturbances, anxiety, depression, and digestive problems [92]. It is important to deal with stress in a healthy way to prevent this exhaustion and protect the proper functioning of the body. Effective strategies for managing stress include relaxation, meditation, regular exercise, a balanced diet, and social support. In addition, it is important to identify and address the underlying causes of stress to prevent overloading of the Hypothalamus Pituitary Adrenal axis and maintain optimal well-being.

From a pharmacological point of view, various studies have reported the efficacy of sertraline and other serotonin reuptake inhibitors (SSRIs), i.e., drugs that originated as antidepressants, which make more serotonin available at nerve synapses: fluoxetine, sertraline, and paroxetine [17,93]. Specifically, the choice of fluoxetine in the treatment of NES is informed by its demonstrated efficacy in other eating disorders [94,95], its tolerability [96,97], and its potential role in a combined treatment approach [98,99]. Furthermore, patients undergoing treatment with antidepressants have exhibited a higher propensity to prematurely discontinue treatment due to adverse events, with fluoxetine being a notable exception [100,101]. These findings suggest that fluoxetine could potentially be integrated into a comprehensive treatment strategy for NES, given the shared characteristics between these disorders [102]. Additionally, some experiences have been published demonstrating the efficacy of topiramate, an anticonvulsant, antiepileptic drug [103–106].

6.2. Comparison with Previous Literature and Contribution to the Field

In contrast to other scholarly articles, this manuscript offers a distinctive contribution to the field of Night Eating Syndrome. It provides a historical perspective, meticulously tracing the evolution of NES definitions and diagnostic criteria, thereby enriching our comprehension of NES's development over time. This is a unique approach compared to the recent review by Lavery and Frum-Vassallo [13], which primarily focuses on the current state of NES research. Unlike other works examined in this paper, this manuscript distinguishes NES from obesity-related eating behaviors and other eating disorders. This differentiation is crucial, as it highlights the unique characteristics of NES and reduces potential misdiagnoses, a perspective that is not as emphasized in the scoping review by Sakthivel, Hay, and Mannan [71]. This manuscript also delves deeper into the psychological aspects of NES, exploring the intricate relationship between NES and various psychological determinants such as depression, anxiety, substance abuse, and emotion regulation. This is a more comprehensive approach than the one taken in the article on the association between NES and physical health [71]. Furthermore, it offers an overview of the

current treatment landscape, discussing existing therapeutic options while underscoring the need for additional research. This aspect is particularly noteworthy as it addresses a gap identified by Lavery and Frum-Vassallo [13], who noted that research on NES treatment remains particularly understudied. This review provides an exhaustive analysis of NES, its psychopathological correlates, and treatment implications—aspects that may have been underemphasized in previous publications [13,71].

6.3. Limitations

This paper acknowledges certain limitations. Our narrative review, which spans a wide spectrum of studies focusing on the etiology, assessment, and clinical treatment strategies of Night Eating Syndrome, may not have been exhaustive. The focus was primarily on the psychological factors of NES, potentially neglecting other possible biological, social, or environmental influences. This paper acknowledges the need for future research to address these gaps and provide a more comprehensive and evidence-based understanding of NES.

7. Conclusions and Future Directions

Night Eating Syndrome is a complex disorder with a multifaceted etiology that includes influences from circadian rhythms, hormonal changes, psychological distress, and personality traits. The assessment of NES requires a comprehensive understanding of these factors. Current treatment options, such as cognitive-behavioral therapy and pharmacotherapy, have shown promise, but there is a need for further research to refine these methods and develop more targeted interventions. It is also important to note that NES often coexists with other psychiatric and medical conditions, complicating its diagnosis and treatment. Therefore, a holistic approach that addresses these comorbidities is crucial for effective management. Lastly, future research should focus on exploring the relationship between neuroticism and NES and investigating the mediating role of psychological distress and coping strategies in the development of the syndrome.

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