



## Research report

## Clinical validity of the descriptor. “Presence of a belief that one must eat in order to get to sleep” in diagnosing the Night Eating Syndrome



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## ABSTRACT

The diagnostic criteria for the Night Eating Syndrome (NES) published in 2010 require the presence of two core criteria: evening hyperphagia and/or nocturnal awakenings for ingestion of food and three of five diagnostic descriptors. One of the descriptors is as follows: “The belief that one must eat in order to fall asleep”. In this study we evaluated whether this conviction is significantly more prominent in obese individuals suffering from insomnia and nocturnal eating, than among obese patients with insomnia who do not eat at night. Ninety-eight obese subjects afflicted by insomnia were included in this study. Eight were affected by NES, 33 by Binge Eating Disorder (BED), and 13 by both BED and NES. Subjects’ insomnia and sleep disturbances were assessed using the Insomnia Severity Index and the Sleep Disturbance Questionnaire. The presence of the belief that one must eat at night in order to sleep was evaluated with the question: “Do you need to eat in order to get back to sleep when you wake up at night?” Patients affected by NES and by both BED and NES were convinced that nocturnal food intake was necessary in order to fall back asleep after a night time awakening. The presence of this belief seemed to be a critical factor in identifying the presence of the Night Eating Syndrome among obese subjects suffering from insomnia.

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## Introduction

Since the first description of NES (Stunkard, Grace, & Wolff, 1955) at least 19 definitions have been introduced into the literature (Striegel-Moore et al., 2006; Vinai et al., 2008). In 2008 the first International Night Eating Symposium (April 26, 2008, Minneapolis, MN) brought together experts from the arenas of eating and sleep disorders. Following the symposium, a set of provisional diagnostic criteria for NES was published (Allison et al., 2010). Following current criteria, NES is characterized by a distress or impairment in functioning due to evening hyperphagia (consumption of at least 25% of daily caloric intake after the evening meal) and/or at least two nocturnal ingestions per week (subjects must have full awareness of their nocturnal behavior). Moreover, at least three of the following descriptors are required: (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 fall asleep, and (5) depressed mood or lowering of mood in the evening and nighttime. The disorder must be present for at least three months and cannot be secondary to another medical or psychiatric disorder.

In the present study we tested the clinical validity of the fourth descriptor: i.e. if the belief that “one must eat in order to fall asleep” was significantly more common among obese night eaters than among obese patients suffering from insomnia who do not eat at night.

Insomnia is an impairing symptom for NES patients. They report greater sleep disturbance as measured by subjective sleep questionnaires (Rogers et al., 2006), have difficulty falling asleep (Marshall, Allison, O’Reardon et al., 2004; O’Reardon, Stunkard, & Allison, 2004), frequent nocturnal awakenings, lower sleep efficiency, and reduced total sleep time (De Zwaan, Roerig, Crosby, Karaz, & Mitchell, 2006; O’Reardon, Ringel, et al., 2004; O’Reardon, Stunkard, et al., 2004; Spaggiari et al., 1994). In the current study, we tested whether the conviction of the inability to fall asleep in

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the evening or to go back to sleep after a nocturnal awakening without eating contributes to onset and/or maintenance of this eating disorder.

## Methods

### Participants

A sleep expert (MM) screened a total of 202 obese subjects during their first medical visit in an eating disorder unit in Northern Italy. All subject evaluations were blind (i.e. their eating habits were unknown). Ninety-eight subjects met ICSD criteria for Insomnia, were recruited and consented. Among them, 79 were female and 19 were male. Age ranged from 22 to 77 years (average age 48.46, sd. 11.46). BMI ranged from 30.12 to 64.44 (average BMI 39.64, sd.8.09).

Insomnia was diagnosed with a clinical interview, following the criteria from the second edition of the International Classification of Sleep Disorders (ICSD-2), ([American Academy of Sleep Medicine, 2005](#)). ICSD2 defines insomnia as difficulty initiating or maintaining sleep, waking up too early, experiencing sleep that is non-restorative, or poor in quality. At least one of the following forms of daytime impairment related to sleep difficulty is reported: fatigue or malaise, attention, concentration, or memory impairment, social or vocational dysfunction, poor school performance, mood disturbance or irritability, daytime sleepiness, motivation, energy, or initiative reduction, being error or accident prone at work or while driving, tension, headaches, or gastrointestinal symptoms in response to sleep loss, and concerns or worries about sleep. Sleep difficulty must occur despite adequate opportunity for sleep.

The interview included the use of the Insomnia Severity Index (ISI) ([Bastien, Vallières, & Morin, 2001](#)) and the Sleep Disturbances Questionnaire (SDQ) ([Espie, Brooks, & Lindsay, 1989](#); [Espie, Inglis, Harvey, & Tessler, 2000](#)). ISI assesses the severity of insomnia, the satisfaction with current sleep patterns, sleep interference, and concerns about sleeping problems. The three subscales of the SDQ assess potential causes of sleep disturbance including physical tension, sleep pattern problems, and mental anxiety.

The presence of an eating disorder was evaluated using the second edition of the Eating Disorders Inventory. NES diagnosis was confirmed by an expert in eating disorders (PV) through a clinical interview, using the above mentioned diagnostic criteria. The presence of BED was assessed through the diagnostic criteria for BED according to the DSM IV TR. The presence of the belief: “I cannot sleep without eating”, was evaluated with the key question: “Do you need to eat in order to get back to sleep when you wake up at night?” The responses were based on the Likert scale: (0) not at all, (1) a little, (2) somewhat, (3) very much so, (4) extremely so.

### Statistical analysis

The statistical analysis included descriptive statistics (mean and standard deviation) and comparisons between the groups using ANOVA, when appropriate. The commercially available software STATISTICA (data analysis software system), version 6, Stat Soft, Inc. (2001) was used for all statistical tests.

## Results

The sample was divided into four groups based on diagnoses: Group 1 included NES patients, group 2 included BED patients, group 3 included patients with a double diagnosis of BED & NES, and group 4 included participants not affected by an eating disorder. No subjects met diagnostic criteria for Anorexia Nervosa

and/or Bulimia Nervosa. The four groups were composed as follows ([Table 1](#)):

There were no significant differences in age or BMI between the groups.

The Insomnia Severity Index (ISI), the three subscales of the Sleep Disturbance Questionnaire, and the question “Do you need to eat in order to get back to sleep when you wake at night?” are shown in [Table 2](#).

There were no differences between the groups on the ISI. Patients with different diagnoses differed for scores at the SDQ subscale ‘physical tension’  $F(3.12)$ ,  $p(0.03)$ . Post Hoc testing (Scheffè) demonstrated a significant difference between patients affected by both NES and BED and obese subjects not affected by any eating disorder, mean difference (2.40),  $p(0.02)$ .

There was a significant difference between groups on the question “Do you need to eat in order to get back to sleep when you wake at night?” ( $F(8.72) = 3$ ,  $p < 0.001$ ). Post Hoc test (Scheffè) showed a significant difference between patients affected by NES and both NES and BED and subjects not affected by nocturnal eating. There were no differences between patients affected by NES and those affected by both BED and NES. There was no difference between groups on the subscale ‘mental anxiety’ ( $F(2.31) = 3$ ,  $p = 0.08$ ) and “sleep problems” ( $F(1.97) = 3$ ,  $p = 0.12$ ) on the SDQ.

## Discussion

The SDQ and the ISI provided no significant differences in sleep quality among obese patients affected by NES or obese patients suffering from insomnia. There was a significant relationship between the presence of NES and the conviction that one must eat in order to fall back to sleep. Patients either affected by NES or by both BED and NES were more compelled to have nocturnal ingestions than obese patients suffering from insomnia. The data sustain the hypothesis that there is a relationship between the presence of the NES and the conviction that eating and sleeping are connected.

The cause for the association between food and sleep among NES patients has yet to be determined. The conviction that it is necessary to eat in order to fall sleep appears to be a useful descriptor in diagnosing NES. Patients might be affected by depression ([Gluck, Geliebter, & Satov, 2001](#); [Allison, Grilo, Masheb, & Stunkard, 2005](#); [O’Reardon, Ringel, et al., 2004](#); [O’Reardon, Stunkard, et al., 2004](#)), sleep disorders, ([De Zwaan et al., 2006](#); [Marshall, Allison, O’Reardon, Birketvedt, & Stunkard, 2004](#); [Napolitano, Head, Babyak, & Blumenthal, 2001](#); [Spaggiari et al., 1994](#)) anxiety ([Sassaroli et al., 2009](#); [Striegel-Moore et al., 2005](#); [Stunkard, Allison, & O’Reardon, 2005](#)), or a combination of all of the above, however these pathologies are not likely the direct cause of nocturnal eating. Rather, they may provide different pathways for insomnia, which could induce this vicious cycle. NES patients assume that it is necessary to eat in order to return to sleep. When they wake up during the night, they immediately take “a sleeping pill of food” (quoted verbatim) and resume sleep very quickly (approximately three minutes on average) ([Manni, Ratti, & Tartara, 1997](#); [Spaggiari et al., 1994](#)). After a nocturnal ingestion, NES patients are able to fall back to sleep (as with subjects who do not eat anything), but the nocturnal eating reinforces their conviction that sleep is related to food, inducing a “conditioned reflex,” which contributes to the maintenance of the syndrome.

It may appear peculiar that in the current sample there was a higher prevalence of BED than NES, but there are no data in the literature on the prevalence of NES among obese insomniac patients. The relatively low prevalence of NES may be a result of the difficulty in disrupting the biological mechanism maintaining nocturnal fasting, even when the sleep rhythm is altered. Considering

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