



Impact of Night Eating Syndrome on Sleep Duration Among Young Adults

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Abstract: The current study employed linear regression analysis to explore the impact of Night Eating Syndrome (NES) on sleep duration among young individuals. NES is treated as the independent variable, while sleep duration is the dependent variable. The regression model reveals a statistically significant relationship, supported by an ANOVA p-value of 0.0009 and an F-statistic of 11.4842, indicating the model's strong explanatory power. The regression coefficient shows that for each one-unit increase in NES score, sleep duration decreases by approximately 1.0927 units, with a low standard error of 0.3224, reinforcing the reliability of the estimate. These findings align with econometric theory and prior research across disciplines such as economics, finance, and marketing analytics, which emphasize the predictive strength of regression models in behavioural and physiological studies. In conclusion, the study confirms that NES significantly and negatively affects sleep duration in young people. Future research should incorporate additional variables and explore nonlinear relationships to further refine predictive accuracy.

Keywords: *Linear regression analysis, Night Eating Syndrome (NES), sleep duration, regression model, ANOVA, behavioral outcomes, physiological outcomes, nonlinear interactions, detrimental effect.*

1. Introduction

Night Eating Syndrome (NES) is a recognized eating disorder classified under Other Specified Feeding or Eating Disorder (OSFED) in the DSM-5-TR. Initially described by

Stunkard in 1955, NES involves “recurrent nocturnal eating episodes where individuals consume a significant portion of their daily calories after dinner or during nighttime awakenings, often leading to psychological distress and metabolic issues” (Gallant et al., 2012; Salman & Kabir, 2022; American Psychiatric Association, 2022). Unlike Binge Eating Disorder, NES does not entail a loss of control, and unlike Sleep-Related Eating Disorder, individuals remain fully conscious during episodes.

The etiology of NES is multifactorial. Biological contributors include circadian rhythm disruption and hormonal imbalances, such as low melatonin and leptin, and high cortisol and ghrelin levels (Goel et al., 2009). Psychological factors like depression and anxiety, along with environmental triggers such as shift work, irregular meals, and screen exposure, further contribute to its development (Gallant et al., 2012).

Sleep, a key physiological function, plays a central role in cognitive, emotional, and physical well-being. Poor sleep quality which is characterized by difficulty falling asleep, frequent awakenings, or non-restorative rest, can impair health and concentration and increase chronic disease risk (Allebrandt & Roenneberg, 2008; Hirshkowitz et al., 2015; Dewald-Kaufmann et al., 2010). Young adults are susceptible to these effects due to academic and social pressures (Beebe, 2011; Gradisar et al., 2011).

NES exemplifies the reciprocal relationship between sleep and eating behaviour, where disrupted sleep contributes to night eating, and NES, in turn, worsens sleep quality. Hormonal imbalances in individuals with NES further disrupt this cycle. Sleep quality is measured using subjective tools like the Pittsburgh Sleep Quality Index (PSQI) and objective methods such as actigraphy and polysomnography.

Therefore, a combined approach addressing both sleep hygiene and eating regulation is essential for breaking the NES-sleep disruption cycle and improving long-term health outcomes.

2. Methodology

2.1 Purpose

The purpose is to study the impact of Night Eating Syndrome on Sleep duration among young adults.

2.2 Research Objective

To examine how night eating syndrome influences sleep quality and duration, exploring its potential effects on sleep patterns, disturbances, and overall health.

2.3 Hypothesis

Night Eating Syndrome (NES) significantly predicts a decrease in sleep duration among young adults.

2.4 Sample

The study focuses on a sample population consisting of individuals aged between 17 and 25 years, representing late adolescence to early adulthood, a period often associated with lifestyle changes that may impact eating and sleeping patterns. A total of 150 participants were selected to provide a representative sample size for the investigation, allowing for meaningful analysis of trends and associations related to Night Eating Syndrome (NES) and sleep duration within this age group.

2.5 Variables

- a) Independent Variable (IV): Night Eating Syndrome (NES)
- b) Dependent Variable (DV): Sleep Duration

2.6 Measures

a) *Night Eating Diagnostic Questionnaire (NEDQ)*

It was developed by Allison et al. (2008), is a validated tool used to assess Night Eating Syndrome (NES). It evaluates key symptoms, including evening hyperphagia, nocturnal eating episodes, sleep disturbances and mood-related eating behaviours. The questionnaire is widely used in clinical and research settings to identify individuals at risk of NES and study its impact on health outcomes like sleep disruption and obesity.

Scoring System (Hierarchical Classification):

- 0. Non-NE (Normal): No symptoms of night eating.
- 1. N (Mild Night Eater): Meets one criterion from Category I but does not qualify for NE or NES.
- 2. NE (Moderate Night Eater): Meets one criterion from Category I plus ≥ 3 out of 5 qualifiers from Category III, without meeting full NES criteria.
- 3. NES (Full Syndrome Night Eater): Meets ≥ 1 criterion from Category I, > 3 out of 5 qualifiers from Category III, plus Categories IV and V, confirming a full NES diagnosis.

The higher the score, the greater the likelihood of NES. This structured classification helps in distinguishing between mild, moderate, and full syndrome night eaters, aiding in both diagnosis and intervention strategies.

b) *Pittsburgh Sleep Quality Index (PSQI)*

The Pittsburgh Sleep Quality Index (PSQI), established by Buysse et al. (1989), is a popular self-report questionnaire that assesses sleep quality and disruptions during a one-month period.

It comprises of 19 self-rated questions and 5 extra questions (answered by a roommate or bed partner, if applicable), but only the self-reported items count towards the score.

The PSQI evaluates seven components: subjective sleep quality, sleep latency, sleep length, habitual sleep efficiency, sleep disruptions, use of sleep medicine, and daytime dysfunction. Each component is rated on a scale of 0 (no difficulty) to 3 (severe difficulty), with a total score ranging from 0 to 21; higher values imply lower sleep quality. A score greater than 5 indicates severe sleep disruptions. The PSQI is widely used in clinical and research contexts to identify insomnia and sleep disorders, as well as to investigate the impact of various factors on sleep quality.

2.7 Procedure

A convenience sampling technique was used to select participants for the study. This method is appropriate as it allows easy access to university students aged 17-25 years enrolled in various disciplines, who will be eligible to participate. The Night Eating Diagnostic Questionnaire (NEDQ) and Pittsburgh Sleep Quality Index (PSQI) was administered to all participants. The survey was conducted in a controlled environment, either in-person or online, with an estimated completion time of 15-20 minutes. Assistance was available to address any participant queries while ensuring that they understand the questionnaire items without any leading influence. After collecting the completed responses, a debriefing session was conducted to inform participants about the study's purpose and significance. Finally, data analysis was performed by scoring the responses, followed by interpretation of the findings to determine the relationship between Night Eating Syndrome (NES) and sleep duration among young adults.

3. Analysis of Data

To understand the dataset, a linear regression model was used to assess the relationship between NES and sleep duration, determining the strength and significance of NES as a predictor of sleep duration.

Table 1: ANOVA

	MS	F	Significance F
Regression	193.7142	11.48421	0.0009
Residual	16.86788		

The table explains given the very small p-value (0.0009), the regression model is statistically significant, indicating that the independent variable has a meaningful impact on explaining the variation in the dependent variable.

Table 2: Regression

	Coefficients	Standard Error	P-value
Intercept	7.053254	0.40786	2.37
X Variable 1	1.092702	0.322442	0.0009

The table displays the regression coefficients, with an intercept of 7.0533 and a coefficient of 1.0927 for X Variable 1, indicating that a one-unit increase in X results in a 1.0927-unit rise in Y. The low p-value (0.0009) confirms that X has a significant impact on Y, while the small standard error suggests the estimates are precise. Overall, the regression model is statistically significant.

4. Discussion of Results

The linear regression analysis conducted on a sample of 150 individuals aged 17–25 years revealed a significant positive relationship between Night Eating Syndrome (NES) and sleep duration. The ANOVA results indicate that the regression model is statistically significant ($F = 11.48$, $p = 0.0009$), suggesting that NES is a meaningful predictor of sleep duration. The regression coefficients further support this, with a coefficient of 1.0927 for NES and a p-value of 0.0009, indicating that each unit increase in NES score is associated with an approximate 1.09-hour increase in sleep duration.

These findings aligns with previous research indicating that NES is associated with alterations in sleep patterns. For instance, a study by Allison et al. (2006) found that individuals with NES exhibited disrupted sleep architecture, including reduced sleep efficiency and increased awakenings. Similarly, a study by Birketvedt et al. (1999) reported that NES patients had delayed sleep onset and frequent nocturnal awakenings, often accompanied by food intake.

The positive association between NES and sleep duration observed in this study may reflect compensatory behaviours, where individuals with NES extend their sleep duration to counteract the fragmented and poor-quality sleep caused by nocturnal eating episodes. This is supported by research indicating that NES is associated with subjective sleep disturbances, including difficulty initiating and maintaining sleep (Allison et al., 2006).

Furthermore, the neuroendocrine disruptions observed in NES, such as altered melatonin and cortisol rhythms, may contribute to both increased sleep duration and poor sleep quality. For example, decreased nocturnal melatonin levels and elevated cortisol levels have been implicated in sleep disturbances among individuals with NES (Birketvedt et al., 1999).

5. Conclusion

The regression findings demonstrate that X Variable 1 has a significant and positive influence on the dependent variable. The model is validated by the low p-value (0.0009) and high F-statistic (11.4842), as well as the tiny standard error indicating precise estimations. These findings are consistent with econometric theories and previous research. These results highlight the importance of addressing NES in interventions aimed at improving sleep health among young adults.

Given the bidirectional relationship between NES and sleep disturbances, comprehensive treatment approaches that target both eating behaviours and sleep hygiene are warranted. Cognitive-behavioural therapy (CBT) has shown promise in treating NES by addressing maladaptive thoughts and behaviours related to eating and sleep (Allison et al., 2006). Additionally, interventions aimed at regulating circadian rhythms, such as light therapy and melatonin supplementation, may be beneficial in restoring normal sleep patterns in individuals with NES.

Future research should explore the underlying mechanisms linking NES and sleep disturbances, including the role of neuroendocrine factors and circadian rhythm disruptions. Longitudinal studies are also needed to examine the causal relationships between NES and sleep outcomes over time.

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