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Identification and Management of Night Eating Syndrome in the Adolescent and Young Adult Population

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ABSTRACT

Objective: Night eating syndrome (NES) is a lesser-known eating disorder that can lead to significant morbidity in adults. However, there is little research into the condition and its comorbidities in the adolescent and young adult population. We sought to compile the existing literature on NES in university student populations to aid health care providers in identifying and treating the condition and its symptoms before it causes adverse health outcomes.

Methods: We conducted a review of the literature from 2003 to present with no limitations using PubMed and Google Scholar. Search terms were *night eating syndrome* AND *student*, yielding 23 articles that were deemed relevant to the review. A manual search of the literature using only *night eating syndrome* was performed to identify any additional studies not included in the initial search. This search yielded an additional 4 articles of interest, including those related to treatment options. A total of 25 studies were included in the final review.

Results: Adolescent patients exhibiting conditions including depression, eating disorders, insomnia, and high levels of stress should be monitored for the development of night eating symptoms. Children of mothers with NES should also be monitored during adolescence, as this confers a higher risk. Interestingly, increased body mass index is not associated with NES in adolescence. Patients that are identified as being at risk should have their comorbid conditions managed medically, while those diagnosed with NES can potentially be treated with cognitive-behavioral therapy and/or selective serotonin reuptake inhibitors.

Conclusions: NES is a clinical entity that requires further investigation, especially concerning adolescents and the development of symptoms during the transition into adulthood. More research is needed on the treatment of the syndrome, as several treatments have been studied but none are US Food and Drug Administration approved.

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Night eating syndrome (NES) is a condition in which a person consciously consumes a significant amount of their daily calories after the evening meal. It falls under the category "other specified feeding or eating disorders" in the *DSM-5*.[1]

The prevalence of NES in the United States has been estimated to be 1.5% in the general population, including up to 42% among

Clinical Points

- Recent literature suggests that night eating syndrome may develop during the late adolescent/young adult period, most commonly in those with specific comorbidities.
- Young adults with depression, anxiety, other eating disorders, or sleep disorders, in addition to those under increased stress, should be screened for night eating behaviors; early treatment of depression can help prevent progression to night eating syndrome.
- Those who screen positive for night eating syndrome can be managed with cognitive-behavioral therapy or serotonin reuptake inhibitors, although neither has US Food and Drug Administration approval due to lack of large-scale studies.

candidates for bariatric surgery.[2] Despite being a relatively common condition, NES is not widely understood, likely because it was not made a formal diagnosis until the *DSM-5* in 2013. Interestingly, the symptoms of NES begin in late adolescence, but it is usually not diagnosed until complications begin to arise later in adulthood.

Several screening questionnaires exist to evaluate night eating symptoms, the most prominent being the Night Eating Questionnaire (NEQ).[3] These scales were developed and validated for the adult population, yet researchers have recently begun testing their validity in younger populations.

Several treatment options have been identified that can aid in suppressing the symptoms of NES. Selective serotonin reuptake inhibitors (SSRIs) and cognitive-behavioral therapy (CBT) currently have the greatest amount of evidence supporting their use, although various other potential treatments have been studied in less detail. The complications of NES in adults are well understood, but it is less well known how the syndrome develops and whether it can be prevented at a young age before complications such as obesity and depression occur.

This review of the literature will seek to compile the current state of knowledge regarding the epidemiology, comorbidities, and treatment options for NES in adolescents and young adults. This information will aid clinicians in the identification and management of the condition, thereby improving the lives of those prone to night eating, while simultaneously helping to combat obesity around the world.

METHODS

We conducted a review of the literature from 2003 to present with no limitations using PubMed and Google Scholar. Search terms were *night eating syndrome* AND *student*, yielding 23 articles that were deemed relevant to the review. A manual search of the literature using only *night eating syndrome* was performed to identify any additional studies not included in the initial search. This search yielded an additional 4 articles of interest, including those related to treatment options. Only studies that examined NES in the high school or college student populations (aged late adolescence to early 20s) were reviewed. Studies found were a combination of cross-sectional, cohort, and randomized controlled trials. A total of 25 studies were included in the final review.[2,4–27]

Evaluation of Night Eating Syndrome

The diagnostic criteria for other specified feeding or eating disorders, which encompasses NES, according to the *DSM-5*[1] are as follows:

A. Recurrent episodes of night eating, as manifested by eating after awakening from sleep or by excessive food consumption after the evening meal.
B. Awareness and recall of the eating.
C. The night eating is not better explained by external influences such as changes in the individual's sleep-wake cycle or by local social norms.
D. The night eating causes significant distress and/or impairment in functioning.
E. The disordered pattern of eating is not better explained by binge-eating disorder or another mental disorder, including substance use, and is not attributable to another medical disorder or to an effect of medication.

Various questionnaires exist for the evaluation of night eating symptoms. These include the Night Eating Diagnostic Questionnaire (NEDQ),[28] Night Eating Symptom Scale (NESS),[29] Night Eating Syndrome History and Inventory (NESHI),[3] and, most commonly, the NEQ.[3,30] Further details on these questionnaires are provided in Table 1.

The NEQ is the oldest, most studied, and only validated screening tool for NES and therefore is the most frequently used scale in the literature. Alternatively, the NEDQ is a newer screening tool that is preferred by some researchers due to its ability to separate groups into mild, moderate, and severe cases, unlike the NEQ, which yields only a global score. The NESS and NESHI are not used in the literature, as they are more useful clinically in diagnostics and treatment monitoring than they are to compare disease severity in research studies.[3]

Four important domains have emerged from the literature, which are evaluated via subscales in the screening questionnaires. These domains are nocturnal ingestions, evening hyperphagia, morning anorexia, and mood/sleep disturbances. While all 4 symptoms are not required for diagnosis of NES, the presence of multiple domains is highly suggestive of the condition.

Various translations of the NEQ have been validated in the adult population, and studies have been performed to determine its use in younger adults. In 3 studies conducted in China,[4] Egypt,[5] and Brazil,[6] respectively, translated versions of the NEQ were administered to local college students to assess reliability (Table 2).

Collectively, these studies indicate that the NEQ can be an adequate screening tool for the evaluation of night eating symptoms in adolescents. Future improvements to the NEQ that tailor the questionnaire toward adolescents

Table 1. Scales Used in the Screening and Diagnosis of Night Eating Syndrome

Scale	No. of Questions	Translations	Validated (yes/no)	Self-Report vs Clinical Administration	Clinical Benefit
Night Eating Questionnaire[3,30]	15	English, Arabic, Portuguese, Chinese, Spanish, Italian, French	Yes	Self-report	Oldest screening tool, only validated scale
Night Eating Diagnostic Questionnaire[28]	20	English only	No	Self-report	Screening tool, provides severity categories
Night Eating Symptom Scale[29]	15	English only	No	Self-report	Monitor for symptom change during treatment
Night Eating Syndrome History and Inventory[3]	NA	English only	No	Clinically administered	Diagnostic confirmation of night eating syndrome

Table 2. Studies Examining Validity and Reproducibility of Various Translations of the English Night Eating Questionnaire (NEQ)

Reference	Study Population	Age, mean, y	Focus of Study	Primary Outcome
He et al[4]	Chinese college students	19.96	NEQ vs simplified Chinese translation	Good reliability, total score significantly correlated with eating pathology
Elsadek et al[5]	Egyptian college students	20.2	NEQ vs Arabic translation	Lower internal reliability than other translations, but still acceptable
da Silva et al[6]	Brazilian adolescents	13.7	NEQ vs Portuguese translation	Excellent reproducibility and good internal consistency

could be beneficial, since several of the subscales were found to not be reliable for the younger population.

Demographics

The majority of research on NES in the younger population is cross-sectional; therefore, demographic data are plentiful. However, research is still needed, particularly regarding the regional impact of NES, since there is significant variability in the current literature based on geographic location. Demographic data, including prevalence, sex differences, and age differences, are provided in Table 3.

Overall, it appears that NES may be more prevalent in the younger population than previously thought. This finding is consistent among studies carried out in China,[4] Egypt,[5] and Italy,[6] in addition to those in the United States. Additionally, NES in the younger population is not associated with an increase in body mass index (BMI), which is in stark contrast to adults with NES, who have been shown to have an increased BMI. Since most studies have been cross-sectional, future research will be needed to determine causality for why this BMI correlation is age dependent. The delayed increase in BMI among those with NES presents an opportunity for clinicians to address the condition before weight gain occurs, potentially preventing the development of obesity in this subset of patients.

Heritability

The Quebec Adipose and Lifestyle Investigation in Youth (QUALITY) cohort study examined NES symptoms in 395 families with at least 1 obese parent.[20] None of the children met the full criteria for NES. However, 10 (2.5%) children reported consuming food while being awake at night, 1.5% reported evening hyperphagia, and all children reporting nocturnal ingestion of food also reported some type of sleep problem.[20] Two mothers (0.5%) and 1 father (0.2%) were found to have NES based on NEQ scores > 25.[20] Interestingly, NEQ scores were significantly correlated between mother and son and between mother and daughter.[20] Spouse-spouse NEQ scores and father-child scores were not correlated. The study[20] concluded that despite a low prevalence of NES in parents and children, specific symptoms tend to aggregate within families.

A case report by Sevinçer and Allison[21] surveyed a 17-member family of which 7 members of 13 who responded met the criteria for NES. Findings regarding heritability coincided with the conclusions of the QUALITY cohort,[20] in which night eating symptoms appear to have a heritable feature. Notably, individual symptoms of mothers appear to be passed to their children.[21]

The lack of significant research into the heritability of NES presents an opportunity for future research. The finding of maternal transmission of symptoms to children is unique and warrants further investigation to fully explain.

Comorbidities

Within the literature, increased BMI is well characterized as a complication of NES in the adult population, in addition to hypertension and diabetes. However, these complications are not seen in adolescents with the condition. In this younger population, conditions such as depression, anxiety, eating disorders, and sleep disorders have been studied as comorbid conditions to NES, while behaviors related to elevated stress and compensatory behaviors have also frequently been seen.[2,3,7–16,18,19,23,24] Nonpsychiatric comorbidities have not been well studied in this population and present a potential opportunity for future research in the field.

Depression

Depression and anxiety are well-characterized comorbidities of NES in the adult population, and the correlation appears to hold true in younger adults as well.

Table 3. Demographic Data on Night Eating Syndrome in Adolescent and Young Adult Populations

Reference	Study Population	Respondents	Age, mean, y	Study Design	Prevalence, %	Differences by Sex	Differences by BMI
He et al[4]	Chinese college students	1,273	NA	Cross-sectional	NA	NA	No correlation
Elsadek et al[5]	Egyptian college students	420	NA	Cross-sectional	4.8	NA	NA
Nolan and Geliebter[7]	American college students	246	18.84	Cross-sectional	5.69	No difference	No correlation
Runfola et al[8]	American college students	1,636	20.9	Cross-sectional	4.2	No difference	No correlation
Fischer et al[9]	American college students	1,514	18–26	Cross-sectional	1.3	No difference	No correlation
Nolan and Geliebter[10]	American college students	254	18.7	Cross-sectional	2.0	No difference	NA
Utzinger et al[11]	American adolescents	242	17	Cross-sectional	5.0	NA	NA
Guo et al[12]	Chinese college freshmen	3,278	NA	Cross-sectional	9.2	Male > female	NA
He et al[13]	Chinese college students	578	20.63	Cross-sectional	1.6	Male > female	No correlation
He et al[14]	Chinese college students	909	16–25	Cross-sectional	2.8	Male > female	NA
Riccobono et al[15]	Italian college students	1,136	NA	Cross-sectional	5.3	NA	No correlation
Yahia et al[16]	American college students	413	20.6	Cross-sectional	1.2	No difference	NA
Meule et al[17]	German adults	2,317	51.45	Cross-sectional	NA	No difference	Age and BMI positively correlated
Guentcheva et al[18]	Canadian students	829	12–24	Cohort	NA	Male > female	NA
Matsui et al[19]	Japanese young adults	3,347	19–25	Cross-sectional	NA	Female > male	NA

Table 4. Studies Evaluating Treatment Options for Individuals With Night Eating Syndrome (NES)

Reference	Type of Study	Focus of Study	Primary Outcome
O'Reardon et al[25]	Randomized controlled trial	Effect of sertraline in the treatment of NES	Greater symptom improvement in treatment group vs placebo group
Vander Wal et al[26]	Randomized controlled trial	Efficacy of escitalopram in the treatment of NES	No significant difference between treatment and placebo groups
Allison et al[27]	Pilot study	Efficacy of cognitive-behavioral therapy in the treatment of NES	10-session cognitive-behavioral therapy had positive effects on NES symptoms and weight loss

Four studies[12,14,15,18] were found in the literature that examined this relationship.

A study by He et al[14] found that Chinese-translated NEQ scores were positively correlated with 21-item Depression Anxiety and Stress Scale scores. This finding indicates that the students from the study who were positive for NES also tended to have greater depression, anxiety, or stress levels.[14] A 2020 study by Guo et al[12] determined that individuals with NES (NEQ scores > 25 or > 30) had a greater prevalence of depressive symptoms (Self Depression Scale scores > 52) than those without NES. Expanding on this finding, they determined that the students with NES had a 3.28-fold greater probability of having depressive symptoms than students without NES.[12] A third study by Guentcheva et al[18] in 2019 surveyed students while in high school, then followed up with surveys at ages 20 and 24 (Depressive Symptoms Scale 20 times during high school, Major Depression Inventory at ages 20 and 24, and NEQ at age 24). Findings included a 4% increase in the odds of night eating with each unit increase in Major Depression Inventory scores, in addition to a 75% increase in the risk of night eating with each unit increase in Depressive Symptoms Scale scores.[18] Therefore, it was determined that depressive symptoms in adolescence are associated with night eating in young adulthood.[18] Finally, a 2020 study by Riccobono et al[15] concluded that subjects with NES had higher scores on the Beck Depression Inventory than those without NES, indicating a correlation between NES and depression.

These studies display the strong correlation between depressive disorders and NES in the young adult population, both cross-sectionally and longitudinally. While the study by Guentcheva et al[18] only showed the relationship between depression in high school and the development of NES several years later, it could potentially be clinically relevant if treating depression early can be clinically proven to prevent the development of NES.

Eating Disorders

NES is a form of eating disorder and can frequently exist alongside symptoms of other eating disorders. Three studies were reviewed that examined a wide array of eating disorder manifestations.

A 2016 study[10] found that Yale Food Addiction Survey (YFAS) scores were correlated with individual NEQ subscores of nocturnal ingestion, evening hyperphagia, and mood/sleep disturbances, thereby indicating that food addiction may be linked to NES. This relationship was significant in both older and younger adults. Since the YFAS measures symptoms of food addiction only, the researchers then compared individual symptoms of food addiction with NEQ scores. Results revealed that only continued use of food despite adverse effects showed significant contribution to NEQ scores.[10] Another study[9] demonstrated that individuals with NES displayed increased shape, eating, and weight concerns compared to healthy controls. Individuals with bulimia nervosa and binge-eating disorder expressed similar concerns, but to a more restrained extent.[9] When compared to those with bulimia nervosa, people with NES had greater concern regarding eating and less preoccupation with body shape.[9] A 2014 study by Runfola et al[8] compared the Eating Disorder Examination Questionnaire (EDE-Q) scores of US university students to their respective NEQ scores. Findings included increased eating disorder pathology (per EDE-Q scores), self-reported prevalence of anorexia nervosa, risk of self-injury, binge drinking, history of psychiatric disorder, and use of attention-deficit/hyperactivity disorder medication within the past year in individuals with NES.[8] Individuals with NES were significantly more likely to have a history of being underweight than overweight. Additionally, 32.8% of those with NES also met criteria for binge-eating disorder, and students meeting the criteria of both conditions displayed an incrementally increased risk of eating disorder pathology than those with only 1 condition.[8]

These studies show that NES shares characteristics with other known eating disorders, specifically bulimia nervosa and binge-eating disorder. Interestingly, adolescents exhibiting criteria of both binge-eating disorder and NES had a greater risk of eating disorder and mood pathology than those with 1 condition, suggesting the possibility of some synergism between the conditions. Young adults with NES displayed a variety of other eating-related comorbidities, including food addiction symptoms and self-reported anorexia. Overall, some extent of night eating may be seen in adolescents and college students with a history of other eating disorders, the most prominent being binge-eating disorder and bulimia nervosa.

Chronic Stress and Emotional Eating

A 2019 study by He et al[13] examined the link between NES and neuroticism in a sample of Chinese college students. Personality traits exist on a spectrum, and individuals who have a tendency toward low emotional stability and negative emotionality have previously been referred to as *neurotic*, although the term has fallen out of favor. Results showed that this type of personality (evaluated via the Eysenck Personality Questionnaire-Short Scale) is positively correlated with night eating; an effect that is partially mediated by psychological distress (evaluated via the Depression Anxiety and Stress Scale) and not by maladaptive coping (evaluated via the Simplified Coping Style Questionnaire).[13] However, the effect of negative emotionality on night eating remained significant even when controlling for psychological distress, suggesting complementary mediation by distress.[13] Another study by He et al[14] also found a correlation between NES and psychological distress; depression, anxiety, and stress were significantly correlated.

Nolan and Geliebter[7] evaluated the relation of emotional eating and NES in college students. The authors define emotional eating as "increased eating in response to negative affect," and it is colloquially known as "stress eating." Using the NEDQ and NESHI to evaluate NES, rather than the NEQ, they found that those with full-syndrome NES had significantly higher emotional eating scores (via the Dutch Eating Behavior Questionnaire) than those with mild and moderate NES and those without NES.[7] Additionally, external eating scores were higher in full-syndrome NES then they were in moderate and mild NES syndromes.[7]

These studies display the correlation between night eating and emotional eating; therefore, individuals under significant stress may be predisposed to emotionally eat, potentially leading to the development of NES. While the exact role may still be unclear, high levels of chronic stress appear to play a significant role in nocturnal eating.

Sleep Disorders

The correlation between sleep disorders and NES is well known; however, it is unknown exactly how the 2 disorders affect each other. Several studies have examined this relation in young adults.

A 2018 study by Kandeger et al[22] found that college students with an evening chronotype had increased insomnia and NEQ scores compared to other chronotypes. They concluded that night eating symptoms have a direct effect of increasing insomnia severity and shifting the chronotype toward eveningness, which then indirectly causes disordered eating attitudes.[22] Similarly, Riccobono et al[15] found NEQ and Morningness-Eveningness Questionnaire scores to be significantly inversely correlated, indicating that night eating is more common in those with an eveningness chronotype. In that study,[15] 11.7% of subjects with NES presented with seasonal affective disorder (SAD), while 5% were found to have subclinical SAD. A 2019 study[23] found an increased prevalence of NES among adolescents reporting poor sleeping. Also, those with NES had poor sleep quality and ate a higher fat, lower carbohydrate diet compared to those without NES.[23] These findings are similar to a study by Yahia et al,[16] in which Pittsburgh Sleep Quality Index scores were increased in students with any level of NES, indicating shorter sleep times and poorer sleep qualities. A study by

Nolan and Geliebter[7] also examined sleep quality in students with NES. Similar to the others, they found that those with moderate and full-syndrome NES had significantly poorer sleep quality than those with mild NES or those without NES.[7]

Overall, these studies indicate that young adults with NES are more likely to be "evening people" and to have difficulty sleeping and decreased sleep quality than those without the condition. There may also be a link between NES and SAD; however, more studies would be necessary to confirm the link and possible causality.

Other Comorbidities

Sleep-related eating disorder (SRED) is a similar condition to NES, in which individuals unconsciously consume food during sleep. A study by Matsui et al[19] examined the similarities between the 2 conditions. In a population of 3,347 Japanese young adults aged 19–25 years, 72% exhibited night eating behavior, while 38% exhibited SRED-like behavior.[19] A strong association was seen between sleepwalking and nocturnal eating behavior, and both night eating behavior and SRED-like behavior were associated with the recent use of hypnotic medications as a sleep aid.[19]

Gallant et al[24] reviewed differences in physical activity among children from the QUALITY cohort. Children with higher NEQ scores were found to have increased daily amounts of vigorous and moderate physical activity compared to those with lower scores. This finding was especially pronounced in the afternoon and evening. Children with lower NEQ scores, conversely, had increased amounts of physical activity in the morning.[24]

Treatment

Treatment options for NES are still relatively unclear, and no medications are currently approved to treat the disorder. Trials evaluating the efficacy of treatments typically do so by serially recording a patient's score on the NEQ while on a treatment regimen. Therefore, if a patient's NEQ score decreases because of a specific therapy, it can be assumed that the therapy was beneficial. Studies evaluating treatment options are provided in Table 4.

Medications that increase serotonin activity in the brain, such as SSRIs, have shown mixed results in clinical trials—significantly reducing NEQ scores in some individuals, while having a marginal effect on NEQ scores in others. Additionally, symptoms may not fully remit following treatment. A 2006 double-blinded randomized controlled trial by O'Reardon et al[25] found that individuals receiving sertraline had significantly greater improvement in night eating symptoms than those receiving a placebo. In contrast, a 2012 double blind RCT by Vander Wal et al[26] found escitalopram to not be statistically superior to placebo in treating NES symptoms. However, it is important to note that there were favorable trends in both NEQ scores and body weight, albeit small.[26] While SSRIs are currently the most studied and efficacious treatment option for NES, further, larger-scale studies should be done to confirm their effect.

A second treatment, CBT focusing on eating modification, relaxation strategies, and sleep hygiene, has shown positive results in some individuals with NES.[26] A study by Allison et al[27] found that a 10-session treatment with CBT had a positive effect on both the symptoms of NES and weight loss. Again, larger studies will be needed to confirm the positive effect of CBT on NES.

Bright light therapy has been attempted in the treatment of refractory NES. In several case studies, NES symptoms have been responsive to 14 morning sessions with a bright light.[27] Thus, bright light therapy may be a promising treatment possibility; however, it has only been evaluated in case reports at this point.

Case reports exist on the use of several other medications, including topiramate and agomelatine, but larger, randomized cohorts are needed to determine their efficacy.[27]

DISCUSSION

While NES remains an understudied condition, enough is known regarding comorbidities and complications to aid health care providers in early identification and management to prevent health consequences later in life. Young patients with common comorbidities such as depression, sleep disorders, other eating disorders, and those under a period of increased stress such as starting college, should be screened for night eating behaviors via the NEQ or NEDQ. For those who screen positive, there are no current US Food and Drug Administration (FDA)–approved treatments available for the condition; however, close management of known comorbidities appears promising. Management of comorbid depression has shown value in preventing the progression to NES.

Future research is needed in the treatment of NES. While several treatment options have been studied, none have been on a large enough scale to merit FDA approval. Understanding the optimal treatments for patients who develop NES could be crucial in preventing significant morbidity related to the condition, and potentially helping to reverse its progression.

CONCLUSION

It is crucial for health care providers to recognize the early symptoms and common comorbidities of NES in adolescents and young adults, since early management can help prevent the complications and comorbidities from developing later in life. While not a widely recognized condition, its prevalence is estimated to be 1.5%, and studies in students have suggested that it may be even higher.

The NEQ is a validated screening tool for NES in adults, and it has been shown to have some usefulness in younger people as well. For future use, it may be beneficial to adjust the questionnaire so that all subscores are reliable in younger populations, since some have been shown to not be.

Health care providers should be aware of children with mothers exhibiting night eating symptoms, as individual night eating symptoms have been shown to be heritable. Patients exhibiting known comorbidities of NES, including depression, other eating disorders, poor sleep, negative mood, and high stress levels, among others, should be monitored for the development of night eating symptoms from a young age. Most importantly, it must be understood that young people who are developing or already have NES will likely not have an elevated BMI, as it typically does not increase until later adulthood.

Many treatments have been studied for NES, with SSRIs having the greatest amount of evidence supporting their use; however, early identification and prevention of the syndrome can help reduce the need for any treatment. Response to intervention can be gauged in the short term by successive NEQ scores over a period of time and by progression to NES and obesity over a longer term.

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POSTTEST

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1. **What is the primary difference in the presentation of night eating syndrome in adolescents in comparison to older adults?**
   a. Depression is a common comorbidity in adolescents only
   b. Body mass index is increased in adults only
   c. Adults are screened via the Night Eating Questionnaire; adolescents are screened via the Night Eating Diagnostic Questionnaire
   d. Hypertension and diabetes are complications of night eating syndrome in adolescents only

2. **Adolescents are at greater risk of developing night eating symptoms during periods of increased stress, such as starting college.**
   a. True
   b. False

3. **Alex is an 18-year-old man who presents to the clinic with complaints of feeling "down" for the past several years, worsening in the past few months. After further evaluation, he is diagnosed with major depressive disorder. Alex recently started college and has struggled with the adjustment to living alone. He has always been an "evening person" and reports difficulty waking up for his 10 AM classes. Which screening tool should be used during Alex's visit to monitor him for night eating behaviors?**
   a. Beck Depression Inventory
   b. Yale Food Addiction Scale
   c. Night Eating Questionnaire
   d. Morningness-Eveningness Questionnaire