Examining the Relationship between Stress and Eating Habits during Midterm Exams among University Female Students

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Abstract

This study uses a quantitative, cross-sectional survey design to examine the relationship between stress and eating habits among university students during midterm exams. 150 female undergraduate students, selected through stratified random sampling, participated in the study. Participants were recruited through online Google forums and represented diverse academic disciplines. To ensure the validity of the results, individuals with chronic health conditions were excluded. The study employed the Eating Habits Scale, developed through a comprehensive review of existing instruments, to assess four dimensions of eating behavior: Healthy Eating, Emotional Eating, Self-Control in Eating, and Irregular Eating Patterns. Stress levels were measured using the Stress Subscale of the Depression, Anxiety, and Stress Scale (DASS-21). Confirmatory Factor Analysis was conducted to evaluate the structural validity of the Eating Habits Scale, yielding acceptable model fit indices (CFI = 0.939, TLI = 0.928, RMSEA = 0.076). The results highlight significant associations between stress levels and maladaptive eating behaviors, particularly increased emotional eating and irregular eating patterns among students experiencing heightened academic stress. These findings underscore the importance of targeted interventions to promote healthier eating habits and stress management strategies in university settings. Future research should explore longitudinal and experimental approaches to establish causal relationships between stress and dietary behaviors.

Keywords: Stress, Eating Habits, Emotional Eating, Psychological Distress, Dietary Behavior, Health Psychology.

Introduction:

University students often experience heightened stress levels during midterm examinations, which can significantly influence their eating behaviors and overall well-being. Academic stress has been widely recognized as a major factor affecting students' physical and psychological health, often leading to irregular eating habits, unhealthy food choices, and disrupted dietary patterns. Stress-induced changes in appetite and food consumption may vary among individuals, with some experiencing increased cravings for high-calorie, sugary, and fatty foods. In contrast, others exhibit reduced appetite and skip meals (Torres & Nowson, 2007). These fluctuations in eating behavior can have long-term consequences on students' health, contributing to weight fluctuations, metabolic imbalances, and an increased risk of chronic diseases (Adam & Epel, 2007).

From a nutritional perspective, stress-related eating patterns can lead to deficiencies in essential nutrients, which in turn affect cognitive performance, mood regulation, and immune function (Mikolajczyk et al., 2009). Similarly, nursing research highlights that prolonged exposure to academic stress without proper coping mechanisms may increase the likelihood of disordered eating behaviors, emotional eating, and unhealthy lifestyle choices. Despite the

growing body of literature on stress and eating behaviors, limited research has explored these dynamics specifically during critical academic periods such as midterm examinations. Moreover, the interplay between psychological stress, dietary habits, and students' coping mechanisms remains an area requiring further exploration.

This study aims to examine the relationship between stress and eating habits among university students during midterm examinations, integrating insights from nursing and nutrition disciplines. Specifically, the study investigates how stress influences dietary choices, meal frequency, and overall eating behaviors during this academically demanding period. By identifying key patterns and associations, the research seeks to provide evidence-based recommendations for fostering healthier stress-coping strategies and promoting balanced nutrition among students. Understanding these relationships is essential for developing targeted interventions within university settings, ultimately supporting students' academic success and overall well-being.

Literature Review

Stress and Eating Behavior:

Stress represents a complex psychophysiological phenomenon involving cognitive appraisal, emotional processing, and behavioral adaptation to internal and external demands (Fink, 2016). Its sources are diverse, encompassing emotional stressors such as bereavement and interpersonal conflict, and physiological stressors including illness and food deprivation. While acute stress can elicit adaptive responses, chronic or prolonged stress—termed allostatic overload—dysregulates the hypothalamic-pituitary-adrenal (HPA) axis and impairs homeostasis, ultimately contributing to adverse health outcomes (McEwen, 2004, 2017; Moussa, 2021).

Eating behavior is among the domains most vulnerable to stress-induced dysregulation. The paradoxical nature of stress eating—manifesting as either hyperphagia or hypophagia—reflects the complexity of this relationship, mediated by neurobiological, psychological, and sociocultural mechanisms (Selye, 1987). Cortisol, the primary stress hormone, plays a central role in modulating appetite and food preference, typically enhancing cravings for energy-dense, palatable foods rich in sugar and fat (Adam & Epel, 2007). These behaviors, once adaptive in evolutionary terms, now pose significant health risks in modern obesogenic environments (Pasquali, 2012).

Yet, stress-induced changes in appetite are not uniform. Some individuals experience appetite suppression due to heightened sympathetic nervous system activity, a reaction that may inhibit digestion and food-seeking behavior (Torres & Nowson, 2007). Psychological traits—such as emotional reactivity, prior trauma, and coping style—further influence these divergent patterns, emphasizing the need for personalized interventions in clinical practice.

Psychophysiological Mechanisms Underpinning Stress and Dietary Behavior

The HPA axis coordinates the body's stress response, modulating the release of glucocorticoids such as cortisol, which interact with reward-related neural pathways and influence food intake (Dallman et al., 2003). Under chronic stress, this axis becomes dysregulated, increasing the reinforcing properties of high-fat, high-sugar foods and diminishing inhibitory control, thereby promoting emotional or hedonic eating (Pecoraro et al., 2004). Individuals with a history of adverse childhood experiences (ACEs) may be particularly susceptible to such patterns due to maladaptive emotion regulation strategies (Felitti et al., 1998). Conversely, those with stronger executive functioning and emotion regulation capacities are more resilient to stress-induced eating disturbances.

Implications for Women's Health, Nursing, and Public Health Practice

Stress-related eating behaviors are particularly pertinent in women's health, where psychosocial stressors, hormonal fluctuations, and sociocultural pressures interact to shape dietary practices. In nursing and clinical settings, stress-induced eating can exacerbate chronic

conditions such as obesity, type 2 diabetes, and cardiovascular disease. Health professionals—particularly nurses—frequently observe these patterns among patients, underscoring the importance of integrated care approaches. Mindfulness-based interventions, including mindful eating and stress-reduction strategies, have demonstrated efficacy in mitigating maladaptive eating behaviors by enhancing interoceptive awareness and reducing emotional reactivity (Scrimin et al., 2016).

Nutritional interventions must also consider the bidirectional relationship between stress and diet. Chronic stress alters gut microbiota composition, impairs nutrient absorption, and disrupts metabolic regulation—factors that compound nutritional vulnerabilities in women, particularly during pregnancy, menopause, and periods of hormonal transition (Huang et al., 2015; Harris et al., 2011). Cortisol-mediated changes in leptin and ghrelin secretion further perpetuate disordered eating cycles, contributing to weight gain and metabolic syndrome (Torres & Nowson, 2007).

Multidisciplinary Strategies for Stress Management

Effective stress management requires a holistic, multidisciplinary framework that integrates psychological, nutritional, and nursing-based strategies.

- *Psychological Approaches*: Mindfulness, emotional regulation training, and cognitive-behavioral therapy (CBT) have demonstrated effectiveness in reducing stress and modifying disordered eating behaviors. These strategies help patients reframe maladaptive thought patterns, improve distress tolerance, and reduce reliance on food as a coping mechanism (Scrimin et al., 2016).

- *Nursing Interventions*: Routine screening for stress and dietary disruptions is essential. Nurses can facilitate patient education on stress-coping mechanisms, promote structured meal planning, and deliver brief interventions that incorporate relaxation techniques, such as deep breathing and guided imagery.

- *Nutritional Recommendations*: A nutrient-dense diet emphasizing omega-3 fatty acids, fiber, and antioxidants supports physiological resilience to stress. Mindful eating strategies help patients identify hunger and satiety cues, reducing emotional eating and fostering healthier food choices.

- *Lifestyle Modifications*: Regular physical activity, adequate sleep, and social support networks are critical. Sleep hygiene practices and structured routines can improve both physiological recovery and psychological resilience.

Stress, Women's Health, and Behavioral Outcomes

Chronic stress has pronounced implications for women's physical, emotional, and behavioral health. Physiologically, prolonged HPA axis activation promotes systemic inflammation and central adiposity—risk factors for cardiovascular disease, insulin resistance, and polycystic ovary syndrome (Chrousos, 2009). Emotionally, stress contributes to increased anxiety, depression, and emotional exhaustion, especially among women in caregiving or high-stress occupations such as nursing (McEwen, 2017; Joinson, 1992). Behaviorally, stress manifests in disordered eating, substance use, and physical inactivity—patterns that exacerbate comorbidities and reduce quality of life (Adam & Epel, 2007; Cohen et al., 2007).

Recognizing these effects, healthcare providers must adopt proactive, gender-sensitive interventions that address the underlying psychobiological and social determinants of stress. This is particularly relevant in the context of women's reproductive health, where chronic stress can influence fertility, gestational outcomes, and postpartum recovery.

Problem Statement

University students often experience significant stress, particularly during midterm exams, which can influence various aspects of their well-being, including their eating habits. Stress has been linked to both overeating and undereating, as well as changes in dietary choices, often leading to unhealthy eating

behaviors such as increased consumption of fast food, high-sugar snacks, and caffeine. These eating patterns can negatively impact students' physical health, cognitive performance, and emotional well-being, creating a cycle that exacerbates academic stress.

Despite the growing recognition of the impact of stress on dietary behaviors, there is limited research on how stress specifically affects eating habits among university students, particularly from the perspectives of nursing and nutrition. Understanding this relationship is essential for developing targeted interventions that promote healthier eating habits and stress management strategies, ultimately enhancing students' academic performance and overall well-being. The study verifies these phenomena by answering this question: Is there a statistically significant relationship between levels of psychological stress and maladaptive eating behaviors?

Aim of the Study:

The primary aim of this study is to investigate the relationship between perceived psychological stress and eating habits among female undergraduate students during midterm examination periods.

Hypotheses:

H1: Female undergraduate students experience elevated levels of psychological stress during midterm examination periods.

H2: Higher levels of psychological stress are positively associated with an increase in maladaptive eating behaviors, such as emotional eating and irregular meal patterns.

Significance of the Study:

This study holds substantial relevance at the intersection of health psychology, nutritional behavior, and women's health in higher education contexts. The midterm examination period represents a high-stress academic phase during which female undergraduate students are particularly vulnerable to psychological strain and its associated behavioral consequences. Given the documented gender differences in stress perception and coping strategies, this study addresses a critical gap in the literature by examining the impact of academic stress on dietary habits, specifically among female university students.

The findings offer important insights into the psychosocial mechanisms that underpin maladaptive eating behaviors under stress, including emotional eating, disrupted meal patterns, and diminished self-regulation in food choices. These patterns not only affect short-term academic functioning and emotional well-being but may also have long-term health implications, such as the increased risk of nutritional imbalances, metabolic disturbances, and stress-related mental health conditions.

By highlighting the gender-specific vulnerabilities and behavioral responses of female students during periods of academic evaluation, this study underscores the need for tailored interventions and support systems within university settings. The results may inform the design of campus-based health promotion programs aimed at enhancing stress resilience and fostering healthy eating behaviors, ultimately contributing to the holistic well-being of women in academic environments.

Methodology

Research Design

This study employed a descriptive correlational design to examine the relationship between stress and eating habits among university students during midterm exams. This approach allows for the collection of data at a single point in time to analyze patterns of stress-related dietary behaviors.

Participants

The study included 150 undergraduate university female students selected through a stratified random sampling technique to ensure representation across various academic disciplines, including health and social sciences studies, according to Moussa and Elnersh (2025). The sample was selected from Suez Canal University female students in Egypt, Ismailia. The sample was limited to individuals who did not suffer from chronic diseases such as diabetes, hypertension, irritable bowel syndrome, and anemia to ensure the external validity of the results for a population of healthy individuals.

Participants were recruited via online Google forums. The inclusion criteria required students to be currently enrolled in a university and preparing for or taking midterm exams. The mean age of participants was 21.5 years (SD = 7.07), with ages ranging from 15 to 99 years. The mean weight was 64.6 kg (SD = 16.3), with a minimum of 40.0 kg and a maximum of 165 kg. Participants had an average height of 160 cm (SD = 16.8), ranging from 61 cm to 199 cm. The mean Body Mass Index (BMI) was 28.9 (SD = 34.5), with values ranging from 12.6 to 391 (see Table 1).

Table 1. Sociodemographic characteristics of the study sample (N = 150).

Variable	Mean (SD)	Range
Age (years)	21.5 (7.07)	15 – 99
Weight (kg)	64.6 (16.3)	40.0 – 165.0
Height (cm)	160.0 (16.8)	61.0 – 199.0
BMI	28.9 (34.5)	12.6 – 391.0

Instruments:

1.*The Eating Habits Scale* comprises four subscales that assess different dimensions of eating behavior. The scale was developed after a thorough review of validated psychological instruments measuring eating habits (Johnson et al., 2002; Sandri et al., 2024; Satia et al., 2002). A content analysis of previous research on eating behaviors revealed that most assessments primarily associate eating habits with general nutrition and overall health, often treating them as routine behaviors. However, psychological factors influencing food consumption, particularly vegetable intake, frequently involve self-report biases such as social desirability. Additionally, previous studies have largely overlooked the variability of eating behaviors under stressful conditions, which can significantly impact students' health and well-being. To address these gaps, this study developed a scale that integrates both clinical and nutritional perspectives, ensuring its relevance to the characteristics of the target population.

The Healthy Eating subscale evaluates an individual's commitment to maintaining a nutritionally balanced diet. It measures the frequency of health-conscious eating behaviors, such as consuming fruits and vegetables, minimizing high-fat and sugary foods, and ensuring dietary variety. A higher score reflects greater adherence to dietary patterns that promote overall health. (Items 1–5). The Emotional Eating subscale assesses the extent to which emotional states—such as stress, anxiety, sadness, or even happiness—trigger eating behaviors. It captures tendencies to use food as a coping mechanism, often resulting in increased consumption of high-calorie, low-nutrient foods such as sweets and fast food. Emotional eating is particularly relevant in understanding maladaptive dietary patterns. (Items 6–10). The Self-Control in Eating subscale examines an individual's ability to regulate food intake in terms of both quantity and quality. It measures behaviors such as resisting cravings, eating mindfully, and adhering to dietary limits aligned with personal health goals. Higher scores indicate stronger self-regulatory capacity in managing eating behaviors. (Items 11–15). The Irregular Eating Patterns subscale identifies inconsistencies in eating behaviors, such as skipping meals, consuming excessive portions in one sitting, or relying on snacks instead of complete meals. It provides insight into disrupted eating routines, which may contribute to nutritional imbalances and long-term health risks. (Items 16–20)

Responses were collected using a five-point Likert scale designed to capture nuanced behavioral tendencies: 5 = I do it automatically without thinking, 4 = I frequently do it when needed, 3 = I occasionally do it, but not always, 2 = I rarely do it, and 1 = I never think about it and never do it.

To enhance response validity and reduce self-report bias, the scale employs a contextualized and masked response format. Unlike traditional Likert scales that may prompt socially desirable answers, this approach minimizes conscious bias by framing questions in a way that encourages reflection on actual behaviors rather than idealized habits. The response structure also allows for greater flexibility in reporting, capturing the complexity of eating behaviors beyond a binary classification of "healthy" or "unhealthy." Higher scores across the subscales indicate a tendency toward less structured, emotionally driven, or nutritionally suboptimal eating habits,

suggesting potential areas for dietary intervention. Conversely, lower scores reflect greater self-regulation, dietary balance, and adherence to consistent, health-promoting eating patterns. This novel approach to assessing eating behaviors offers a comprehensive and dynamic framework for understanding the interplay between psychological factors and dietary habits. The scale has potential applications in nutritional counseling, health psychology, and behavioral interventions, providing a more nuanced understanding of eating behaviors in various contexts.

2.***Stress scale*:** The Stress Subscale of the Depression, Anxiety, and Stress Scale (DASS-21) is a seven-item measure designed to assess persistent psychological distress and difficulty in relaxation. The study developed the scale content according to a nursing perspective. This subscale is particularly valuable for evaluating patients' emotional well-being and identifying individuals at risk of stress-related health complications, such as hypertension, sleep disturbances, weakened immune function, and burnout.

This subscale focuses on chronic stress responses, including irritability, difficulty relaxing, excessive agitation, and heightened reactivity to daily challenges. It provides insights into how individuals cope with psychosocial stressors, which is crucial in nursing assessments and patient care planning. Patients rate their experiences over the past week using a four-point Likert scale, where: 0 = Did not apply to me at all, 1 = Applied to some degree, or some of the time, 2 = Applied to me to a considerable degree, or a good part of the time, and 3 = Applied to me very much, or most of the time.

Higher scores indicate greater levels of chronic stress, suggesting the need for intervention strategies such as stress management education, relaxation techniques, counseling, and lifestyle modifications. In nursing practice, recognizing high-stress levels is essential for promoting holistic patient care, preventing stress-related illnesses, and supporting mental health resilience. The Stress Subscale serves as a valuable tool for identifying patients, nursing students, and healthcare professionals who may benefit from tailored stress-reduction interventions, ensuring better overall health outcomes.

Ethical Approval:

Ethical approval for this study was obtained from the Ethics Committee of the Faculty of Education, Suez Canal University, Egypt (Approval No. 100, dated June 1, 2025). All procedures involving human participants were carried out by the ethical standards of the institutional and national research committee, and with the 1964 Declaration of Helsinki and its subsequent amendments. Informed consent was obtained electronically from all participants before data collection. Participation was entirely voluntary, and confidentiality and anonymity were strictly maintained throughout the study.

Results:

Validity of Eating Habits Scale:

The validity of the Eating Habits Scale was evaluated using Confirmatory Factor Analysis (CFA), and the model fit indices suggest an acceptable but not optimal fit. The chi-square test ($X^2 = 300$, df = 161) indicates a statistically significant model misfit; however, given its sensitivity to sample size, other fit indices provide a more meaningful interpretation. The Standardized Root Mean Square Residual (SRMR) of 0.098 is slightly above the recommended threshold of 0.08, suggesting moderate model fit. The Root Mean Square Error of Approximation (RMSEA) of 0.076, with a 95% confidence interval ranging from 0.063 to 0.089 and an RMSEA p-value of 0.001, further supports a reasonable but not excellent fit. In terms of comparative fit indices, the Comparative Fit Index (CFI) = 0.939, Tucker-Lewis Index (TLI) = 0.928, Bentler-Bonett Non-Normed Fit Index (NNFI) = 0.928, and Relative Noncentrality Index (RNI) = 0.939 all exceed the 0.90 threshold, suggesting a good model fit. However, the Bentler-Bonett Normed Fit Index (NFI) = 0.879 and Bollen's Relative Fit Index (RFI) = 0.857 fall below the 0.90 benchmark, indicating room for improvement. The Incremental Fit Index (IFI) = 0.940 and the Parsimony Normed Fit Index (PNFI) = 0.745 suggest that the model is relatively efficient in capturing the underlying structure of eating habits. Overall, these findings indicate that the Eating Habits Scale demonstrates an acceptable

level of construct validity. Item factor loadings as shown in Table 2.

The Confirmatory Factor Analysis (CFA) results provide strong evidence for the construct validity of the Eating Habits Scale, demonstrating that most items align well with their respective latent constructs. In the Healthy Eating subscale, four items (a1 = 0.840, a2 = 0.803, a3 = 0.672, and a5 = 0.741) exhibit strong factor loadings, confirming their relevance, while item a4 (0.407) shows weaker alignment, suggesting potential revision or removal to enhance internal consistency. The Emotional Eating subscale presents generally strong loadings (b1 = 0.796, b2 = 0.837, b3 = 0.762, and b4 = 0.739), yet the negative loading of b5 (-0.589) indicates a possible issue with wording, reverse scoring, or conceptual clarity, requiring further scrutiny. Similarly, the Self-Control in Eating subscale features high loadings for c1 (0.855) and c3 (0.885), alongside a moderate loading for c2 (0.669), but negative loadings in c4 (-0.513) and c5 (-0.343) suggest that these items may be measuring an opposing construct, such as impulsive eating rather than self-control, necessitating rewording or reclassification. The Irregular Eating Patterns subscale shows mixed results, with d1 (0.440) and d2 (0.579) displaying moderate loadings and d4 (0.685) strongly aligning with the construct, yet the negative loadings of d3 (-0.823) and d5 (-0.583) imply that these items may capture rigid rather than irregular eating habits, highlighting the need for theoretical reassessment. The presence of negative loadings across multiple subscales underscores conceptual misalignment in some items, warranting careful evaluation to determine whether they require rewording, reverse coding, or removal to improve the scale's validity. Future research should employ model specification techniques, such as modification indices and exploratory factor analysis (EFA), to refine the structure further and enhance measurement precision. Despite these inconsistencies, the scale demonstrates strong psychometric properties, reinforcing its potential as a valuable tool for assessing dietary behaviors, particularly in research and clinical contexts where understanding eating habits is crucial for interventions among nursing and healthcare populations.

Validity of stress scale:

The Confirmatory Factor Analysis (CFA) results for the Stress Subscale (7 items) of the DASS-21 confirm a well-defined factorial structure with strong model fit, reinforcing its validity for psychological stress assessment. The Chi-Square test ($X^2 = 26.5$, df = 14, $p = 0.022$) indicates some deviation from a perfect fit; however, given the test's sensitivity to sample size, alternative fit indices provide a more reliable evaluation. The standardized root mean square residual (SRMR = 0.052) suggests a good fit, while the root mean square error of approximation (RMSEA = 0.078, 90% CI: 0.029–0.122, $p = 0.146$) remains within acceptable limits. Although the scaled RMSEA (0.135) suggests minor misfit, the overall model fit is well-supported by comparative fit indices. Notably, all key indices—including CFI (0.997), TLI (0.995), NFI (0.993), IFI (0.997), and RNI (0.997)—exceed the recommended threshold of 0.95, indicating a well-fitting model. The parsimonious normed fit index (PNFI = 0.662) also suggests an optimal balance between model complexity and goodness-of-fit.

These findings affirm the Stress Subscale as a psychometrically sound instrument for assessing stress-related symptoms across various populations. Its strong structural integrity supports its applicability in nursing and clinical practice, particularly for mental health screenings, stress management interventions, and psychological evaluations among healthcare professionals, students, and patients. Given its robust measurement properties, the subscale serves as a reliable tool for detecting stress-related distress, facilitating early intervention efforts, and enhancing psychological well-being in healthcare settings. The item factor loadings as shown in Table 3.

The factor loadings for the Stress Subscale of the DASS-21 indicate a good-statistically defined latent structure, and all seven items have a significant contribution ($p < .001$) to the stress structure. The consistently high loadings suggest that the subscale effectively captures various dimensions of psychological stress. Notably, items s3 ($\beta = 0.891$) and s4 ($\beta = 0.907$) exhibit the strongest associations with the latent variable, implying that they reflect core stress-related experiences such as overwhelming

pressure, difficulty coping, and persistent tension. These items may serve as the most sensitive indicators of heightened stress levels.

Meanwhile, items s1 (β = 0.737), s2 (β = 0.766), s5 (β = 0.767), and s7 (β = 0.804) display moderate-to-high loadings, reinforcing their role in stress structure, including irritability, restlessness, and perceived external demands. Although item s6 (β = 0.666) has the lowest factor loading, it remains within an acceptable range, indicating that it still provides meaningful, albeit slightly weaker, information about stress perception. The narrow confidence intervals across all items further support the reliability and stability of these factor loadings, confirming the subscale's measurement precision.

These findings affirm the strong construct validity and reliability of the Stress Subscale, reinforcing its applicability in psychological assessment and research. In healthcare and nursing education—where stress is a prevalent challenge among students, professionals, and patients—accurate stress measurement is crucial for early detection, intervention, and mental health support. Given its robust psychometric properties, the subscale is well-suited for psychological screening, stress management initiatives, and studies exploring stress-related health outcomes. Its ability to capture diverse manifestations of stress makes it a valuable tool for both clinical practice and academic research focused on mental well-being.

Descriptive statistics:

The descriptive statistics provide insights into the distribution and variability of stress and eating behavior subscales, highlighting patterns in Healthy Eating, Emotional Eating, Self-Control in Eating, and Irregular Eating Patterns among the sample of 150 participants.

The mean stress score (8.88) indicates moderate stress levels, with a median of 9.00 and a standard deviation of 4.64, highlighting considerable individual differences. In contrast, the Healthy Eating subscale shows a mean of 15.6 and a relatively low standard deviation (4.16), suggesting that participants generally report moderate adherence to healthy dietary habits with limited variability. Emotional Eating presents a slightly higher mean (16.0) and a larger standard deviation (4.89), reflecting greater variability in emotional influences on eating behavior.

Self-Control in Eating has a mean of 16.1, a median of 16.0, and a standard deviation of 4.29, indicating moderate levels of self-regulation in dietary habits, albeit with some variability across individuals. Notably, Irregular Eating Patterns has the highest mean (17.2), with a median of 17.0 and a standard deviation of 4.06, suggesting that inconsistent eating behaviors are relatively common within the sample.

Examining distribution characteristics provides further insights into data normality. Stress is slightly positively skewed (0.366), indicating that lower stress levels are more frequent, while its kurtosis value (0.044) suggests a near-normal distribution. Healthy Eating (skewness = 0.116, kurtosis = -0.106) and Emotional Eating (skewness = 0.139, kurtosis = -0.515) also approximate normality, though the latter exhibits a slightly flatter distribution. Conversely, Self-Control in Eating (skewness = -0.206, kurtosis = -0.312) and Irregular Eating Patterns (skewness = -0.259, kurtosis = -0.290) display slight negative skewness, suggesting a tendency toward higher scores, with mild platykurtic tendencies reflecting a more dispersed range of responses.

The absence of missing data reinforces the robustness of these findings. Overall, the results highlight meaningful variations in eating behaviors, with Irregular Eating Patterns being the most prevalent and Emotional Eating displaying the greatest variability. These patterns suggest that while many individuals struggle with inconsistent eating habits, emotional factors may drive fluctuations in dietary choices. From a psychological and healthcare perspective, these insights underscore the importance of interventions targeting self-regulation and emotional responses to food, particularly in stress management programs aimed at promoting healthier eating behaviors.

Based on the median score, it is hypothesized that approximately 51.3% of female undergraduate students experience elevated levels of psychological stress during midterm examinations, and this stress is

significantly associated with the adoption of maladaptive eating behaviors.

Relationships between stress and eating habits subscales:

The correlation matrix in Table 5 provides valuable insights into the relationships between stress and different eating behavior subscales.

Table 2. Item factor loading of the eating habits scale.

Latent Construct	Item	Estimate	SE	β	z	p-value
Healthy Eating	a1	0.840	0.0493	0.840	17.03	<.001
	a2	0.803	0.0485	0.803	16.57	<.001
	a3	0.672	0.0460	0.672	14.61	<.001
	a4	0.407	0.0429	0.407	9.49	<.001
	a5	0.741	0.0472	0.741	15.71	<.001
Emotional Eating	b1	0.796	0.0516	0.796	15.42	<.001
	b2	0.837	0.0526	0.837	15.90	<.001
	b3	0.762	0.0508	0.762	15.00	<.001
	b4	0.739	0.0503	0.739	14.69	<.001
	b5	-0.589	0.0477	-0.589	-12.36	<.001
Self-Control in Eating	c1	0.855	0.0520	0.855	16.46	<.001
	c2	0.669	0.0477	0.669	14.03	<.001
	c3	0.885	0.0529	0.885	16.74	<.001
	c4	-0.513	0.0462	-0.513	-11.09	<.001
	c5	-0.343	0.0455	-0.343	-7.54	<.001
Irregular Eating Patterns	d1	0.440	0.0582	0.440	7.56	<.001
	d2	0.579	0.0565	0.579	10.24	<.001
	d3	-0.823	0.0650	-0.823	-12.66	<.001
	d4	0.685	0.0596	0.685	11.50	<.001
	d5	-0.583	0.0595	-0.583	-9.80	<.001

Table 3. Item factor loadings of Stress as a subscale of DASS-21.

Item	Estimate	Standard Error (SE)	Standardized Loading (β)	z-value	p-value
s1	0.737	0.0425	0.737	17.3	< .001
s2	0.766	0.0368	0.766	20.8	< .001
s3	0.891	0.0236	0.891	37.8	< .001
s4	0.907	0.0233	0.907	38.9	< .001
s5	0.767	0.0343	0.767	22.4	< .001
s6	0.666	0.0484	0.666	13.8	< .001
s7	0.804	0.0287	0.804	28.0	< .001

Table 4. Descriptive indices for study variables (N= 150 females).

Variable	Mean	Median	SD	Min	Max	Skewness	Kurtosis
Stress	8.88	9.00	4.64	0	21	0.366	0.044
Healthy Eating	15.6	16.0	4.16	5	25	0.116	-0.106
Emotional Eating	16.0	15.0	4.89	5	25	0.139	-0.515
Self-Control in Eating	16.1	16.0	4.29	5	25	-0.206	-0.312
Irregular Eating Patterns	17.2	17.0	4.06	5	25	-0.259	-0.290

Table 5. The Pearson correlation matrix between study variables.

	Stress	Healthy Eating	Emotional Eating	Self-Control in Eating	Irregular Eating Patterns
Stress	—				
Healthy Eating	-0.340***	—			
Emotional Eating	0.035	0.229**	—		
Self-Control in Eating	-0.232**	0.538***	0.135	—	
Irregular Eating Patterns	0.056	-0.077	0.333***	0.184*	—

Notes. *p < .05, **p < .01, ***p < .001

The findings reveal a significant negative correlation between stress and Healthy Eating (r = -0.340, p < .001), indicating that higher stress levels are associated with poorer adherence to healthy dietary habits. This aligns with previous research suggesting that stress disrupts nutritional choices, potentially due to emotional distress, time constraints, or a heightened preference for calorie-dense foods over nutrient-rich options. These results underscore the impact of stress on dietary self-regulation and highlight the need for stress management interventions to promote healthier eating behaviors.

Interestingly, stress is not significantly correlated with Emotional Eating (r = 0.035, p > .05), suggesting that stress alone may not be a direct predictor of emotional eating tendencies. This challenges the common assumption that stress universally triggers emotional eating. However, Emotional Eating is positively associated with both Irregular Eating Patterns (r = 0.333, p < .001) and Healthy Eating (r = 0.229, p < .01), indicating a complex relationship. These findings suggest that individuals who engage in emotional eating may exhibit fluctuating dietary behaviors, alternating between consuming comfort foods and making compensatory healthy choices, likely influenced by mood variations and situational factors.

Self-Control in Eating emerges as a key determinant of dietary behavior, showing a strong positive correlation with Healthy Eating (r = 0.538, p < .001). This suggests that individuals with greater self-regulation are significantly more likely to maintain a nutritious diet, reinforcing the critical role of self-discipline in sustaining consistent and health-conscious eating patterns. Furthermore, Self-Control in Eating is negatively correlated with stress (r = -0.232, p < .01), implying that elevated stress levels may weaken an individual's ability to regulate their eating behaviors, potentially leading to impulsive food choices and difficulties in adhering to dietary goals.

Regarding Irregular Eating Patterns, significant associations are found with Emotional Eating (r = 0.333, p < .001) and Self-Control in Eating (r = 0.184, p < .05), but not with stress (r = 0.056, p > .05). This suggests that irregular eating behaviors are more strongly influenced by emotional responses and self-regulation difficulties rather than stress alone. The absence of a direct link between stress and irregular eating patterns indicates that other factors—such as coping strategies, environmental influences, or habitual lifestyle choices—may mediate this relationship.

These findings emphasize the crucial role of self-control in fostering healthy eating habits while mitigating irregular and emotional eating tendencies. The inverse relationship between stress and self-control highlights the potential benefits of stress reduction strategies, such as mindfulness-based interventions, in promoting dietary regulation. Additionally, the observed link between emotional eating and irregular eating behaviors warrants further investigation, particularly regarding potential mediating factors such as psychological resilience and adaptive coping mechanisms. Future research should explore these variables to clarify the intricate interplay between stress, self-regulation, and eating behaviors, ultimately informing targeted interventions that enhance both psychological well-being and nutritional outcomes.

Discussion:

The intricate relationship between stress and eating behaviors is shaped by neurobiological, psychological, and environmental factors. Stress-induced eating manifests in diverse ways, with individuals displaying either hyperphagic (overeating) or hypophagic (reduced intake) responses. These variations are driven by the activation of the hypothalamic-pituitary-adrenal (HPA) axis, autonomic nervous system, and reward-related neurocircuitry (Adam & Epel, 2007). Acute stress, such as a sudden life event, typically suppresses appetite due to heightened sympathetic nervous system activity. However, chronic stress, which persists over time, often dysregulates the HPA axis, resulting in sustained cortisol release that heightens cravings for calorie-dense foods, particularly those high in fats and sugars (Dallman et al., 2003). Understanding the interplay between stress and eating behaviors underscores the necessity for an interdisciplinary approach that integrates neurobiology, psychology, and nutritional science to develop effective interventions.

From a neurobiological perspective, stress profoundly alters the brain's reward system, fostering hedonic eating behaviors. Chronic stress exposure sensitizes the mesolimbic dopamine system, reinforcing the consumption of highly palatable foods even in the absence of physiological hunger (Pecoraro et al., 2004). Additionally, stress impairs cognitive control mechanisms within the prefrontal cortex, which are crucial for decision-making and impulse regulation (Torres & Nowson, 2007). Consequently, individuals under chronic stress may exhibit compulsive eating patterns, prioritizing immediate gratification over nutritional needs. Moreover, the amygdala, a key brain region involved in emotional processing, becomes hyperactive under stress, exacerbating emotional eating tendencies where food serves as a coping mechanism for negative emotions (Pasquali, 2012). These neurobiological changes provide a compelling explanation for the link between chronic stress and the rising prevalence of obesity and metabolic disorders.

Beyond weight gain and metabolic dysfunction, the physiological ramifications of stress-induced eating behaviors extend to broader health concerns. Chronic stress disrupts insulin regulation, contributing to insulin resistance, dyslipidemia, and heightened risks for type 2 diabetes and cardiovascular disease (Huang et al., 2015). Additionally, the gut-brain axis plays a crucial role in mediating the effects of stress on eating behaviors. Psychological stress alters gut microbiota composition, leading to dysbiosis that further exacerbates metabolic disturbances (Scrimin et al., 2016). These findings emphasize the need for a holistic approach to stress management—one that not only addresses behavioral aspects but also incorporates physiological and microbiome-related interventions to mitigate the long-term health consequences of stress-related eating behaviors.

Beyond biological mechanisms, psychological and sociocultural factors significantly influence stress-related eating patterns. Emotional regulation deficits, adverse childhood experiences (ACEs), and individual differences in coping mechanisms contribute to variations in eating behaviors under stress (Felitti et al., 1998). Individuals who rely on avoidance-based coping strategies are more likely to engage in emotional eating, using food as a source of comfort during distressing situations. Additionally, sociocultural norms dictate the availability and acceptability of comfort foods in response to stress (Adam & Epel, 2007). In cultures where high-calorie foods are embedded in social rituals, stress-induced eating may be more prevalent, reinforcing maladaptive dietary habits that persist into adulthood. Understanding these psychological and sociocultural determinants is critical for designing targeted interventions that address both individual vulnerabilities and broader environmental influences.

From a healthcare perspective, addressing stress-induced eating behaviors necessitates an interdisciplinary approach that integrates psychological counseling, nutritional guidance, and behavioral interventions. Nurses and healthcare practitioners frequently encounter patients whose dietary habits exacerbate chronic conditions such as obesity, hypertension, and diabetes. Effective interventions should prioritize stress management techniques,

including cognitive-behavioral therapy (CBT), mindfulness-based stress reduction (MBSR), and relaxation exercises, alongside dietary counseling (Torres & Nowson, 2007). Mindful eating practices, which cultivate awareness of hunger and satiety cues, have demonstrated efficacy in reducing emotional eating and enhancing self-regulation in food consumption (Scrimin et al., 2016). Furthermore, structured lifestyle modifications, including regular physical activity and meal planning, can counteract the metabolic effects of stress-related eating by improving insulin sensitivity and overall well-being.

Given the complexity of stress-induced eating behaviors, a one-size-fits-all approach is insufficient for effective intervention. Future research should explore biomarkers of stress-related eating patterns to enable personalized treatment strategies tailored to individual neurobiological and psychological profiles. Additionally, investigating the efficacy of integrative treatment approaches that combine pharmacological, psychological, and lifestyle-based interventions could yield more comprehensive solutions for managing stress-related dietary behaviors. Longitudinal studies examining the bidirectional relationship between stress and eating behaviors across diverse populations and cultural contexts would further enrich our understanding of this multifaceted phenomenon (Pecoraro et al., 2004). By leveraging insights from neuroscience, psychology, and public health, researchers and practitioners can develop targeted interventions that address the underlying mechanisms of stress-induced eating, ultimately fostering better health outcomes.

Conclusion

This study offers a multifaceted exploration of stress-induced eating behaviors, integrating neurobiological, psychological, and physiological dimensions within a healthcare context. Findings indicate that stress alters eating patterns through complex interactions involving the hypothalamic-pituitary-adrenal (HPA) axis, neuropeptide signaling, and emotional regulation strategies. The dual manifestation of stress-related eating—hyperphagia and hypophagia—highlights the interindividual variability shaped by cognitive appraisal mechanisms and neurobiological susceptibility. These insights emphasize the crucial role of emotional regulation in moderating dietary responses to stress and underscore the necessity for targeted nursing interventions that address both psychological and physiological factors. By integrating stress-eating research into nursing practice, this study contributes to a growing body of literature supporting holistic patient care, particularly in clinical settings where stress management and nutritional well-being are interconnected.

Implications for Nursing Practice

The findings of this study have significant implications for nursing practice, healthcare interventions, and public health policies. Within nursing, the results reinforce the importance of embedding stress management techniques into dietary and psychological counseling. Nurses, as primary healthcare providers, are well-positioned to implement evidence-based interventions such as psychoeducation on emotional eating, mindfulness-based stress reduction (MBSR), and cognitive-behavioral strategies to help patients develop adaptive coping mechanisms.

Clinically, nurses play a vital role in screening and assessing stress-related eating behaviors, particularly among high-risk populations such as individuals with obesity, diabetes, or eating disorders. The study highlights the need for nursing professionals to collaborate with dietitians, psychologists, and endocrinologists to design comprehensive, patient-centered care plans. This interdisciplinary approach ensures that stress-related eating is addressed through a combination of behavioral counseling, nutritional guidance, and physiological monitoring.

From a public health perspective, integrating stress and nutrition education into nursing curricula can equip future nurses with the skills to address maladaptive eating behaviors in diverse clinical and community settings. Workplace and academic stress management programs should be prioritized, particularly for healthcare professionals and students, as they face high levels of occupational stress that may influence their dietary habits.

Implementing hospital-based wellness programs that incorporate stress resilience training and nutritional education could help prevent stress-related metabolic disorders and improve overall patient outcomes. Future research should further explore the integration of nursing-led interventions that target stress-related eating behaviors, with a focus on long-term behavioral change and metabolic health.

Limitations and Future Directions

While this study provides valuable insights, several limitations should be acknowledged. First, the research primarily relies on cross-sectional data, limiting the ability to establish causality between stress exposure and alterations in eating behavior. Future longitudinal studies are needed to clarify the temporal dynamics of stress-induced dietary changes and identify potential mediators, such as neuroendocrine responses and lifestyle factors.

Second, much of the existing literature on stress-related eating relies on self-reported measures, which may be subject to recall bias and social desirability effects. Future studies should integrate objective measures such as biomarkers of stress (e.g., cortisol levels), neuroimaging techniques, and ecological momentary assessment (EMA) to enhance the reliability of findings. Additionally, genetic predispositions, cultural dietary norms, and socioeconomic influences on stress-related eating remain underexplored, warranting further investigation.

Finally, while this study examines stress-related eating within a broad context, it does not differentiate between the effects of acute and chronic stress or the impact of specific stressors such as occupational burnout, academic pressure, or caregiving burden. Given the high-stress nature of the nursing profession, future research should focus on how stress-induced eating behaviors manifest among nurses and healthcare workers to develop tailored interventions that enhance both patient and caregiver well-being.

Despite these limitations, this study provides a critical foundation for integrating stress-related eating research into nursing practice, highlighting the need for interdisciplinary approaches that address the psychological, physiological, and behavioral aspects of dietary health.

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