

THE ASSOCIATION BETWEEN PERCEIVED STRESS AND EATING PATTERNS AMONG UNIVERSITY STUDENTS

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Abstract

Background: Psychological stress is known to significantly influence health associated behaviors, especially in student population. The challenges of academic life and the transition to adulthood often contribute to the development of poor dietary habits during university years.

Objective: This study aimed to examine the association between the levels of perceived stress and eating behaviors in university students.

Methods: A cross-sectional survey was conducted among 200 students enrolled at the Law Faculty and the High Medical School of the University "St. Kliment Ohridski" – Bitola. Data were collected using three tools: a demographic questionnaire, the Perceived Stress Scale (PSS-10), and the Weight-Related Eating Questionnaire (WREQ). Statistical analyses included chi-square tests, correlation assessments, and ANOVA.

Results: The majority of participants reported moderate levels of stress, with female students exhibiting significantly higher stress scores ($p = 0.0125$). A positive correlation was observed between stress levels and disordered eating patterns, particularly emotional eating ($p = 0.0082$).

Conclusion: The findings indicate that emotional eating is a prevalent coping mechanism among distressed university students, with a stronger expression observed in males. Student-centered support programs that focus on stress reduction and healthy nutrition should be implemented as essential tools for promoting university student health and well-being.

Keywords: Perceived stress, emotional eating, university students

Introduction

Stress is broadly recognized as a response to internal or external challenges that disrupt psychological and physiological homeostasis of a person [1].

It influences human health through both biological and behavioral channels [2].

On the biological level, it activates the autonomic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis, leading to the release of hormones such as cortisol, adrenaline, and noradrenaline, and initiates complex neuroendocrine responses [2].

From a behavioral standpoint, prolonged stress often encourages unhealthy lifestyle practices, particularly poor dietary choices, which can elevate the risk of developing chronic diseases like obesity, cardiovascular illness, and certain cancers [2].

Individuals who suffer from high stress are more likely to opt for calorie-dense, low-nutrient foods [2], experience a general decline in diet quality [3,4], and to show irregular eating habits including skipping meals or overeating [5,6].

Eating behavior is shaped by a dynamic interplay between internal physiological regulators and external influences such as socio-economic conditions, food accessibility, and environmental cues [7,8]. Within this framework, perceived stress (PS) has emerged as a significant predictor of disordered eating behavior [1].

A growing body of literature reports elevated levels of perceived stress among university students globally, especially among female students [9–11].

The transition into university life often brings increased academic obligations and changes in social context, contributing to this phenomenon [12,13]. Additional sources of stress include financial constraints, academic competitiveness, health concerns, and lack of adequate social support [12,14–16].

High levels of PS in students have been correlated with adverse outcomes such as anxiety, impaired academic achievement, sleep irregularities, physical inactivity, and greater risk of weight gain and obesity [17–19].

For example, a Korean study highlighted that students reporting high PS consumed more processed foods and snacks, skipped meals more often, and tended to overeat, compared to peers with lower stress [11].

A similar pattern was observed among medical students at King Saud University, where female students with elevated PS reported increased intake of salty snacks, sweets, and fast food compared to males [9].

In an earlier study in our country, 75% of female medical students with optimal body mass index, who reported sufficient levels of physical activity, were advised to decrease body fat mass, based on the analysis of body composition using bioelectrical impedance [20].

These data highlight the strong negative impact of perceived stress on dietary patterns, with a notable increase in the consumption of unhealthy foods among those under higher psychological strain.

A particular behavioral response to chronic stress is emotional eating (EE), where food is used as a strategy to cope with emotional discomforts such as sadness, loneliness, anxiety, or even joy [21]. This behavioral tendency reflects a difficulty in distinguishing between hunger and emotional needs, indicating a maladaptive coping style [22].

Evidence shows that students prone to emotional eating often present with higher PS, increased body weight, lower physical activity, and overall unbalanced diets [23,24].

This study aimed to examine the association between the levels of perceived stress and eating behaviors in university students in our country.

Materials and Methods

This cross-sectional study included 200 students of both sexes enrolled at the “St. Kliment Ohridski” University – Bitola, specifically from the Faculty of Law and the High Medical School. Data collection involved three tools composed as questionnaires: Biographical Questionnaire (BQ), Perceived Stress Scale (PSS -10) and – Weight-Related Eating Questionnaire (WREQ).

All questionnaires were distributed in printed form. Participation was voluntary and anonymous, and students gave verbal informed consent prior to involvement. Data were collected in classrooms under supervision over the course of one week. Each respondent required approximately 15–20 minutes to complete the forms.

The BQ was custom- developed for the needs of this study. It gathered data on demographic information (age, gender, residence, household income), social background (living situation, romantic relationships, presence of close social connections), and lifestyle characteristics (hobbies, use of alcohol, tobacco, illicit substances, or tranquilizers).

The PSS-10 is a validated tool for measurement of the intensity of perceived stress over the last month. It includes 10 questions rated on a 5-point Likert scale, ranging from 0 ("never") to 4 ("very often"). Intermediate values were: 1 ("almost never"), 2 ("sometimes"), and 3 ("fairly often"). Based on total scores, participants were categorized into three levels of stress: low (0–13), moderate (14–26), and high (27–40).

The scale captures experiences related to perceived control, pressure, and emotional reactivity to everyday challenges.

The WREQ is a questionnaire used to assess psychological factors linked to eating behavior and weight regulation. It includes 16 items rated from 1 ("not at all") to 5 ("completely"), and covers four subscales: Emotional Eating, Restrained Eating, External Eating and Impulsive(Uncontrolled)Eating. Subscale scores were calculated as means, allowing assessment of specific behavioral tendencies. The WREQ provides a multidimensional view of eating behavior, especially in terms of emotional, external, and cognitive restraint.

Data were digitized using Microsoft Excel and further analyzed in SPSS. Official scoring instructions for the PSS-10 and WREQ instruments were followed precisely during analysis.

Results

This study included 200 participants aged between 19 and 54 years. The majority of respondents were between 19 and 25 years old. Of the total participants, 55 (27.5%) were male and 145 (72.5%) were female. Regarding faculty affiliation, the respondents were divided between the Higher Medical School and the Faculty of Law at “St. Kliment Ohridski” University – Bitola. An equal number of students (100) were included from each faculty.

By gender distribution within faculties: at the Higher Medical School, 81 participants (81%) were female and 19 (19%) were male, while at the Faculty of Law, 64 participants (64%) were female and 36 (36%) were male. Out of all participants, 110 (55%) reported having a hobby, while 90 (45%) did not.

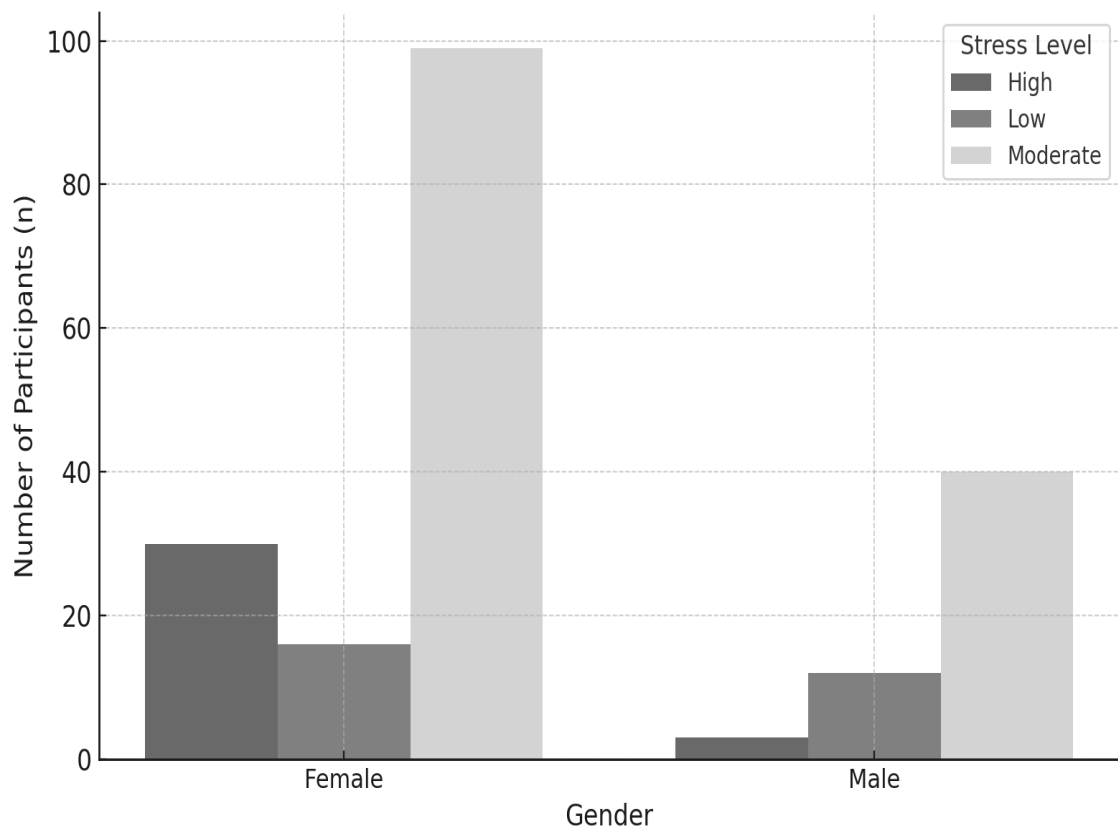


Figure 1. Distribution of participants according to perceived stress level and gender.

As can be seen from figure 1, the levels of perceived stress (PSS) among all participants were as follows: low stress: 28 participants (14%), moderate stress: 139 participants (69.5%), high stress: 33 participants (16.5%).

Moderate stress levels predominate in both genders, with a dominant representation among female participants. It is evident that female participants more frequently report high levels of stress compared to male participants, whereas the "low stress" category is more pronounced among males ($\chi^2 = 6.32$, $df=4$, $p = 0.0125$).

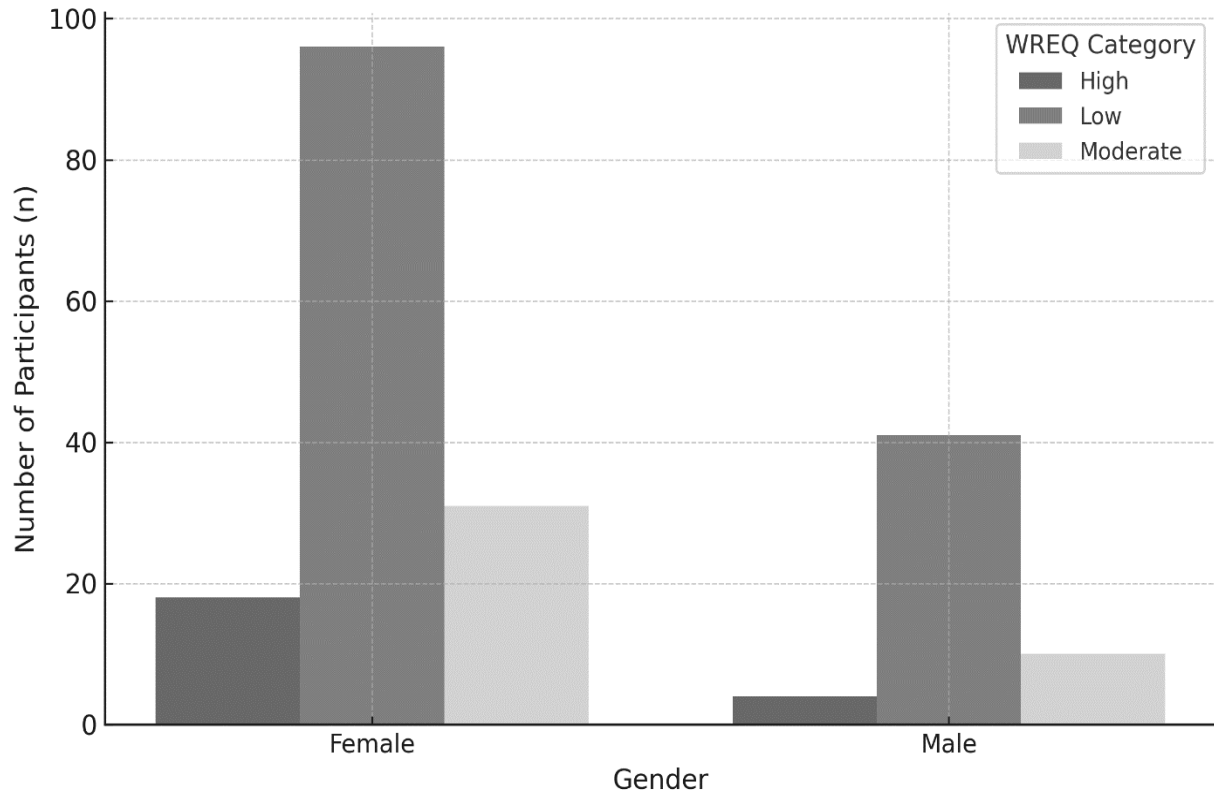


Figure 2. Distribution of participants by WREQ category and gender.

As can be seen from figure 2, 137 participants (68.5%) showed low eating behaviour, 41 participants (20.5%) showed moderate eating behaviour, while 22 participants (11%) showed high eating behaviours. Female participants are significantly more frequently represented in the low WREQ category, while this distribution is less pronounced among male participants.

Although female participants are more frequently found in both the "low" and "high" WREQ categories, and male participants are mainly in the "low" category, statistical analysis revealed that these differences are not significant ($\chi^2 = 2.33$, $df = 4$, $p = 0.312$). Since $p > 0.05$, there is no statistically significant association between gender and eating behavior as measured by WREQ categories.

Pearson correlation coefficient for total WREQ and total PSS scores is $r = 0.25$ ($p = 0.0004$). This indicates that as the level of perceived stress (PSS) increases, there is a tendency for the WREQ score (reflecting emotional/external/restrained eating behaviors) to also increase, although the correlation is weak.

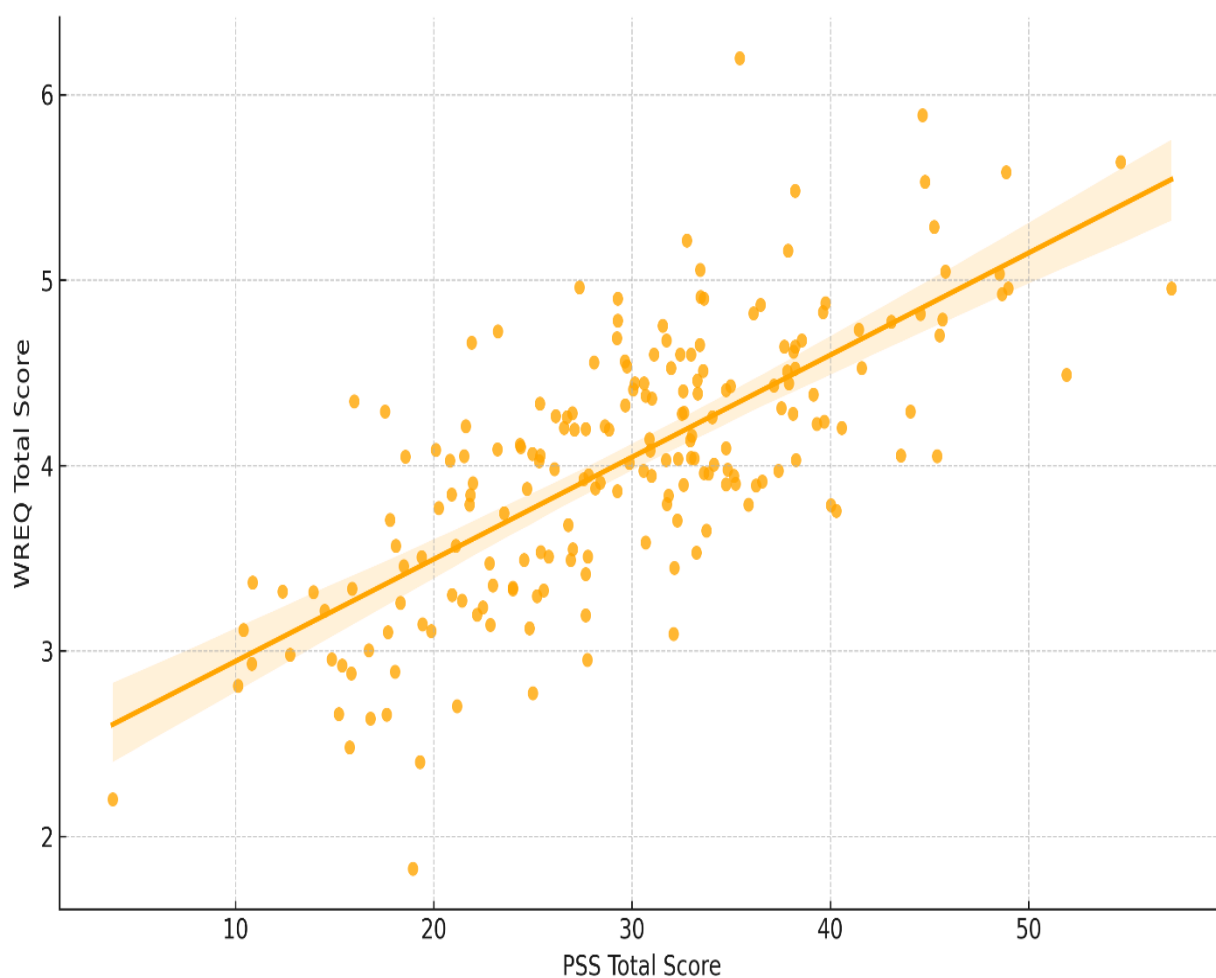


Figure 3. Scatter plot illustrating the positive correlation between perceived stress (PSS) and eating behavior (WREQ).

Despite a statistically significant trend, the observed variability indicates a weak-to-moderate association. This chart depicts the relationship between stress (PSS) and eating habits (WREQ). The trend line reveals a weak but statistically significant positive correlation—higher stress levels are associated with a greater tendency toward dysregulated eating behavior.

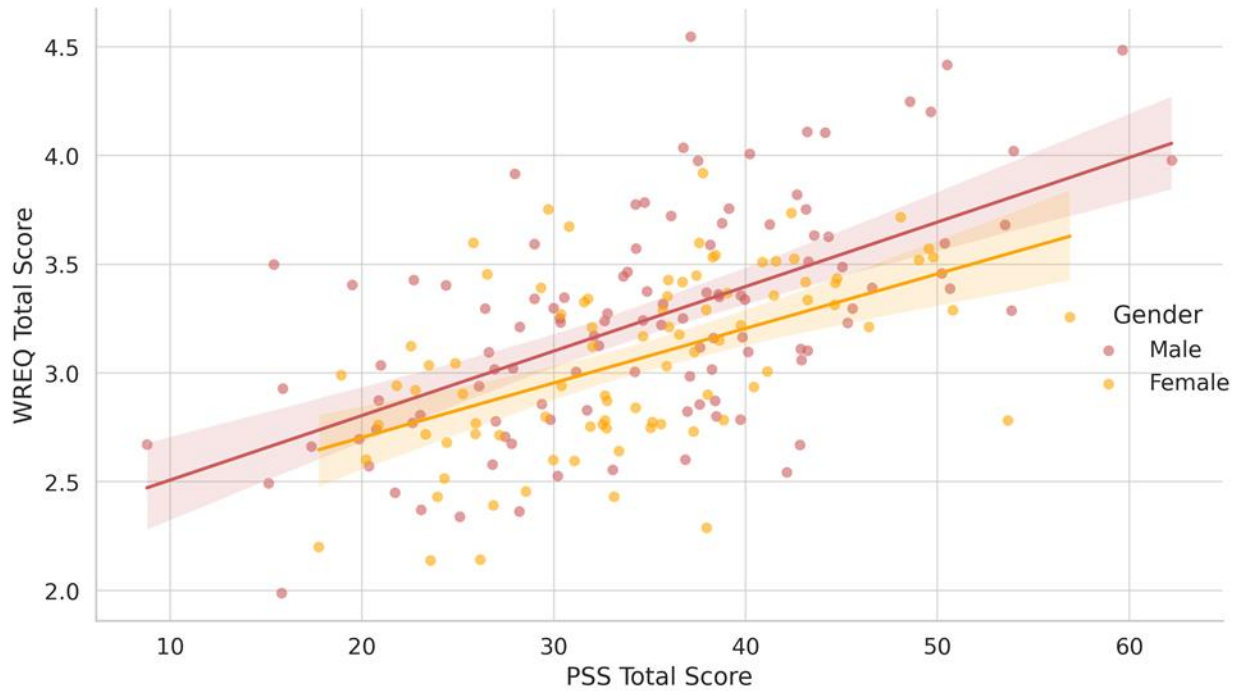


Figure 4. Correlation between perceived stress levels (PSS) and eating behavior (WREQ), analyzed by gender.

A positive association is evident for both males and females, but the relationship appears stronger among male participants. The scatterplot displays regression lines and 95% confidence intervals separately for each gender. Pearson correlation coefficient by gender was $r = 0.334$ ($p = 0.0128$) for males and $r = 0.187$, ($p = 0.0241$) for females. These findings suggest that perceived stress is more strongly associated with maladaptive eating behaviors in males than in females.

Table 1. Differences in WREQ subscale scores based on levels of perceived stress (PSS).

Subscale	F-value	p-value
Emotional Eating	4.92	0.0082*
External Eating	1.93	0.1477
Routine Restraint	2.53	0.0820
Compensatory Restraint	1.26	0.2856

* $p < 0.05$

Table 1 presents the results of ANOVA tests analyzing the differences in WREQ subscale scores based on levels (low, moderate and high) of perceived stress (PSS). Among the four subscales, only 'Emotional Eating' shows a statistically significant difference between groups with different stress levels ($p = 0.0082$).



Figure 5. Boxplot illustrating differences in emotional eating scores across stress level groups (low, moderate, high).

As can be seen from figure 5, participants with higher perceived stress reported higher emotional eating tendencies, which aligns with the statistically significant ANOVA result ($p = 0.0082$). Post hoc analysis using Tukey's HSD test revealed the following comparisons for emotional eating by stress level: High vs Low stress: statistically significant difference ($p = 0.0084$); High vs Moderate stress: statistically significant difference ($p = 0.0311$); Low vs Moderate stress: no statistically significant difference.

Discussion

This study, to our best knowledge represents the first investigation on the association of the levels of perceived stress and eating behaviors in university students in our country. There is sufficient data on other multiple factors that affect mental and physical health of university students, especially medical and dentistry students [20, 25, 26].

Our study identified a statistically significant relationship between perceived stress (PSS) and students' eating behaviors. The majority of respondents reported moderate levels of stress, with females exhibiting higher scores than males ($p = 0.0125$; Figure 1).

This observation is consistent with previous research suggesting that women are more vulnerable to academic and emotional challenges during their studies [10,13,15, 25,26].

It is worth to note that, although female students reported higher stress, the behavioral impact of stress—particularly disordered eating—was more prominent among male participants. A moderate positive correlation was observed for males ($r = 0.334$, $p = 0.0128$), while a weaker but still significant correlation was found for females ($r = 0.187$, $p = 0.0241$).

These gender-specific trends may indicate differences in coping mechanisms. Men, though less likely to articulate emotional difficulties, may express stress through maladaptive behaviors such as emotional or uncontrolled eating [21,22].

Although gender-based differences in WREQ eating behavior categories were not statistically significant ($p = 0.312$), the distribution indicated greater variability among female students, particularly within the "low" and "high" categories. This might reflect individual variation in emotional regulation and response to stress [23].

The overall correlation between total PSS and WREQ scores, while weak, was statistically significant ($r = 0.25$, $p = 0.0004$), suggesting that elevated stress levels are associated with a higher likelihood of adopting unhealthy eating behaviors.

Among all subscales of the WREQ, only emotional eating (EE) showed statistically significant differences across stress groups ($F = 4.92$, $p = 0.0082$). Follow-up analysis using Tukey's HSD test confirmed that students with high stress levels reported greater emotional eating tendencies than those with moderate or low stress ($p = 0.0084$ and $p = 0.0311$, respectively).

These findings are supported by theoretical frameworks that conceptualize emotional eating as a maladaptive strategy used to manage emotional discomfort such as sadness, loneliness, or anxiety [21,22]. Prior studies have shown that students prone to emotional eating often report higher perceived stress, increased body weight, lower physical activity, and unbalanced diets [23,24].

Furthermore, although there was no significant difference in overall stress levels between faculties ($p = 0.491$), the correlation between stress and eating behaviors was stronger in Law students ($r = 0.345$, $p = 0.0004$) than in Medical students ($r = 0.246$, $p = 0.0135$). This might reflect varying academic expectations and available coping resources across disciplines [12,16].

Overall, these results emphasize the need for gender-sensitive and faculty-specific strategies to promote psychological resilience and healthy lifestyle habits among university students. Interventions should focus on emotional self-regulation, stress management, and nutritional awareness to mitigate the risk of stress-related disordered eating.

Conclusion

This study provides compelling evidence of a significant association between perceived stress and disordered eating behaviors among university students, particularly with regard to emotional eating. While female students reported higher overall stress levels, male participants appeared more likely to manifest that stress through maladaptive eating patterns.

The findings highlight emotional eating as a key behavioral response to psychological strain, suggesting the importance of identifying students at greater risk especially males and those enrolled in non-health-related faculties such as law. The stronger correlation observed in this group suggests that faculty-specific academic environments may influence both stress levels and coping behaviors.

These results emphasize the need for comprehensive student wellness programs that incorporate both mental health support and nutritional education. Proactive efforts to teach effective coping strategies, promote emotional self-regulation, and encourage balanced eating habits could help mitigate the negative health effects associated with stress-driven dietary behaviors.

Future research should explore longitudinal patterns of stress and eating behavior over time and consider additional psychosocial factors, such as social support, resilience, and individual coping styles. Tailored interventions that address these complex interactions could greatly improve student health outcomes.

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