

RELATIONSHIP BETWEEN ACADEMIC STRESS AND UNHEALTHY EATING AMONG UNIVERSITY STUDENTS: MEDIATING EFFECT OF SLEEP QUALITY

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Abstract

Introduction Academic stress has become a major concern for university students due to its impact on lifestyle and health behaviours. Stress often triggers unhealthy eating and poor sleep quality, which further exacerbates psychological and physical problems.

Purpose This study investigates the relationship between academic stress and unhealthy eating among students, with sleep quality as a mediating factor.

Methods A total of 350 students from universities of Islamabad and Rawalpindi completed self-report questionnaires including the Perception of Academic Stress scale, Healthy and Unhealthy eating Behaviours Scale, and Pittsburgh Sleep Quality Index. Data were analyzed through correlation, regression and mediation analysis using SPSS and PROCESS Macro.

Results Reliability analysis showed good internal consistency of a scale (α ranging from .68 to .81). Findings indicated a significant positive relationship between academic stress and unhealthy eating ($r = .258, p < .001$), a weak but significant correlation between unhealthy eating and sleep quality ($r = .119, p = .02$), and a significant negative correlation between academic stress and sleep quality ($r = -.110, p = .03$). Mediation analysis revealed that sleep quality did not significantly mediate the relationship between academic stress and unhealthy eating. Gender analysis showed males reported slightly higher eating habits than females, while no significant differences were found for stress and sleep quality.

Conclusion The results suggests that academic stress directly predicts unhealthy eating, while sleep quality has a limited mediating role. Promoting stress management, healthy eating, and sleep hygiene is crucial for students' well-being.

INTRODUCTION

Background

Due to its detrimental consequences on one's physical and mental health, the link between academic stress and poor diet has received a lot of

attention (Oliver & Wardle, 2000). Under pressure, students often experience both physiological and behavioral shifts. The stress

hormone cortisol plays a key role, increasing cravings for high-calorie "comfort foods" and undermining nutritional balance (Oliver & Wardle, 2000). This leads to inconsistent eating patterns skipping meals, binge eating, or relying on convenient, processed snacks which can impair energy, cognitive function, and ultimately, academic performance itself (Nieuwenhuijsen et al., 2006).

This stress-diet cycle is further complicated by sleep quality. Academic stress can disrupt sleep, and in turn, sleep deprivation heightens stress reactivity and imbalances hunger hormones like ghrelin and leptin, making unhealthy food choices more likely (Taheri et al., 2004). Consequently, a vicious circle forms where stress promotes poor eating and sleep, which then exacerbates stress.

However, getting adequate sleep acts as a protective measure. It enhances cognitive function, emotional regulation, and decision-making, allowing children to better manage stress and refrain from making snap food choices (Spiegel et al., 2004). Students who get enough sleep eat more nutrient-dense foods and are better able to stop the cycle, according to research (Lund et al., 2010).

In conclusion, poor eating is encouraged by hormonal and behavioral changes brought on by academic stress; this trend is exacerbated by insufficient sleep. Sleep quality must be addressed in order to support students' academic success and overall wellness. This is due to the fact that it improves kids' capacity to handle stress and make healthier food choices.

Problem Statement

To find out the connection between college students' poor eating habits and academic stress and how Sleep quality mediate this relation.

Objectives

- To explore the connection between academic stress, unhealthy eating, and sleep quality.
- To examine the mediating role of sleep quality between academic stress and unhealthy eating.
- To analyze gender differences in stress, eating behaviors, and sleep quality.

Hypotheses

H1: There will be a significant relationship between, Unhealthy Eating Behaviour, Academic Stress and Sleep Quality.

H2: There will be a significant mediating impact of Sleep Quality on Unhealthy Eating Behaviour and Academic stress.

H3: There will be a significant difference of Academic Stress, Healthy and Unhealthy eating, and Sleep Quality among male and female.

Operational Definition

Academic Stress

The body's reaction to demands associated to school that surpass pupils' capacity for adaptation is known as academic stress (Lin & Chen, 2009).

Unhealthy Eating Behavior

Unhealthy eating behavior refers to dietary patterns that deviate from recommended nutritional guidelines and are characterized by the consumption of energy-dense, nutrient-poor foods, irregular meal patterns, or excessive intake of specific food groups (Neumark-Sztainer et al., 2002).

Sleep Quality

Self-satisfaction with every facet of the sleep experience is the measure of sleep quality. Four factors determine the quality of sleep: wakefulness after sleep onset, sleep efficiency, sleep latency, and duration (Nelson et al., 2022).

Literature Review

Research consistently demonstrates a bidirectional relationship between academic stress and unhealthy dietary habits. A foundational study by Oliver and Wardle (2000) found that a majority of stressed individuals report altered eating patterns, notably an increased consumption of energy-dense foods. This often initiates a vicious cycle: stress boosts stress levels and causes bad eating patterns, such as binge eating, skipping meals, and relying on fast food and coffee (Mikołajczyk et al., 2009).

Stress and eating are related in two ways. Stress directly affects two physiological processes: the hypothalamic-pituitary-adrenal (HPA) axis and

elevated cortisol secretion (Weekes et al., 2006). Simultaneously, people's responses to stress cause them to eat more or less, which has an indirect impact on health through behavioral changes (Torres & Nowson, 2007).

Critically, sleep quality is a key mediator in this relationship. Lack of sleep makes the issue much worse by making people choose foods high in calories and raising their risk of obesity (Taheri et al., 2004), and is linked to poorer meal patterns among students (Lund et al., 2010). On the other hand, having seven to nine hours of sleep is linked to healthier eating and improved stress management (Spiegel et al., 2004), while poor sleep is strongly correlated with higher stress, anxiety, and depression (Zhang et al., 2024). Thus, students' performance and well-being can be severely harmed by the three interconnected problems of poor eating habits, insufficient sleep, and academic stress.

Methodology and Study Design

A quantitative correlational strategy was used to investigate the relationship between academic stress, unhealthy eating, and sleep quality. 350 undergraduate students (ages 17–27) from Islamabad and Rawalpindi universities were chosen by simple random selection. A main study involving 300 students and a pilot study involving 50 students for reliability testing comprised the two phases of data collecting. Among the ethical considerations were voluntary involvement, informed consent, and confidentiality.

Sample size

In the current study data was collected from 350 University students, both genders, from universities of Islamabad.

Sample technique

Simple Random sampling technique was applied to Collect data from conveniently selected universities in Islamabad.

Research Instruments

These research instruments were used in the

present study:

The Pittsburgh Sleep Quality Index

The Pittsburgh Sleep Quality Index (PSQI), a self-report questionnaire, assesses sleep quality and disruptions throughout the preceding month. The 19 questions measure seven major characteristics of sleep: sleep efficiency (the quality of your sleep-in bed), subjective sleep quality, sleep latency (the time it takes to fall asleep), total sleep duration, sleep interruptions, usage of sleep aids, and daytime functioning. Each of these components has a distinct value, and the total score ranges from 0 to 21. A higher score indicates poorer sleep quality (Buysse et al., 1989).

Perceptions of Academic Stress Scale(PAS)

In order to measure students' perceptions of academic stress and its causes, Bedewy and Gabriel developed the 18-item Perceptions of Academic Stress Scale (PAS) in 2015. Students' academic expectations, workload/examinations, and academic self-perceptions are measured using a 5-point Likert-type scale; higher scores imply higher stress levels (PAS; Bedewy & Gabriel, 2015).

Healthy Unhealthy Eating Behaviours Scale(HUEBS)

Using the Healthy and Unhealthy Eating Behavior Scale, we ascertained the frequency of consumption of both beneficial and detrimental foods. "I use fruits" is an example of bad eating on this scale, but "I eat fruits" and "I use white sugar or artificial sweeteners" are examples of healthy eating. Each claim is rated on a seven-point scale, with 1 denoting "never" and 7 denoting "always." Healthier eating habits are indicated by higher overall scores, which range from 22 to 110 (Guertin et al., 2020).

Data Analysis

PROCESS Macro and SPSS was used to conduct correlation and mediation investigations. Independent-sample t-tests were used to look at gender disparities.

Table 1

Correlation between Healthy and unhealthy eating behavior, Perception of academic stress, and Pittsburgh Sleep Quality Index (n=350)

Variable one	Variable 2		r	p
Healthy/Unhealthy Eating behavior	Perception of Academic Stress		.258**	<.001
Healthy/Unhealthy Eating behavior	Pittsburgh Sleep Quality Index	Sleep	.119*	.02
Perception of Academic Stress	Pittsburgh Sleep Quality Index	Sleep	-.110*	.03

The above table (1) indicates the results of Pearson correlation statistics show a statistically significant positive relationship between "Healthy/Unhealthy Eating Behavior" and the "Pittsburgh Sleep Quality Index" ($r = .119^*$, $p = .02$) and "Perception of Academic Stress" (r

$= .258^{**}$, $p < .001$). On the other hand, "Perception of Academic Stress" and the "Pittsburgh Sleep Quality Index" were found to have a statistically significant negative connection ($r = -.110^*$, $p = .03$). Every correlation that was reported was significant at $p < .05$.

Table 2

Mediation Analysis (n=350)

Mediation Analysis of the Effect of PAS on HUEB through PSQI

Relationship	TE	DE	IE	95% (Bootstrapped)	C.I. t	Conclusion
PAS → HUEB	→ 0.2362 ($p < .001$)	0.2392 ($p < .001$)	-0.0029	LL=-0.0171, UL=0.0080	4.9870	No significant Mediation

Detailed Effects of the Mediation Analysis

Effect Type	Effect	SE	t	p	95% CI (LL)	95% CI (UL)
Total Effect						
PAS → HUEB Direct Effect	0.2362	0.0474	4.9870	<.001	0.1431	0.3294
PAS → HUEB Indirect Effect	0.2392	0.0478	5.0076	<.001	0.1452	0.3331
PAS → PSQI → HUEB	-0.0029	0.0061			-0.0171	0.0080

The above tables indicates the results mediation study that "Perception of Academic Stress" had a statistically significant positive direct effect on "Healthy/Unhealthy Eating Behavior" ($\beta = 0.2362$, $p < .001$). This effect persisted even after adjusting for the "Pittsburgh Sleep Quality Index" ($\beta = 0.2392$, $p < .001$). PAS did not, however,

have a significant indirect impact on HUEB through PSQI ($\beta = -0.0029$, 95% CI [-0.0171, 0.0080]). It is implied that PSQI does not mediate the link between PAS and HUEB because the confidence interval comprises 0.

Table 3 Mean, Standard Deviation and t-test of Perception of Academic stress, Healthy Unhealthy Eating Behavior and Pittsburgh Sleep Quality Index among Male and Female (n=350)

Variables	Male		Female		t	p		95% CI		Cohen's d
	M	SD	M	SD		M	SD	UL	LL	
Perception of Academic Stress	58.73	7.61	59.96	8.42	2.07	.965	.088	3.46		8.030
Healthy/Unhealthy Eating behavior	67.39	7.13	65.74	10.18	1.75	<.001	-.19	3.50		8.79
Pittsburgh Sleep Quality Index	43.22	10.27	42.76	9.92	.42	.26	-.16	2.58		10.10

Table (3) above displays the results of an independent samples t-test comparing male and female participants in three variables: the Pittsburgh Sleep Quality Index, healthy/unhealthy eating habit, and perception of academic stress. Men scored significantly higher than women on the Healthy/Unhealthy Eating Behavior scale ($p < .001$). However, there were no statistically significant gender differences in either the Pittsburgh Sleep Quality Index ($p = .26$) or the Perception of Academic Stress ($p = .088$). The only significant difference was that males rated higher on eating habits.

Results

Reliability analysis indicated that all scales had good internal consistency: HUEBS ($\alpha = .680$), PAS ($\alpha = .710$), and PSQI ($\alpha = .819$). There was a small but significant relationship between unhealthy eating and sleep quality ($r = .119$, $p = .02$), a negative association between academic stress and sleep quality ($r = -.110$, $p = .03$), and a large positive correlation between academic stress and unhealthy eating ($r = .258$, $p < .001$).

Mediation analysis revealed that sleep quality did not significantly mediate the relationship between academic stress and unhealthy eating ($\beta = -.0029$, 95% CI [-0.0171, 0.0080]).

Gender comparisons revealed no significant differences in academic stress and sleep quality, though males reported slightly healthier eating habits compared to females.

Discussion

This study examined sleep quality as a potential mediator in the association between academic stress and unhealthy eating patterns among college students. Strong reliability was

demonstrated by the Pittsburgh Sleep Quality Index (PSQI; $\alpha = 0.819$), the Perception of Academic Stress scale ($\alpha = 0.710$), and the Healthy Unhealthy Eating Behavior Questionnaire ($\alpha = 0.680$).

The results showed a strong positive relationship between poor eating habits and academic stress, suggesting that poor eating habits are linked to higher stress levels. Additionally, a lower positive association between poor sleep quality and unhealthy eating was discovered. Regression analyses showed that sleep quality did not significantly predict academic stress, despite a significant negative correlation between academic stress and sleep quality. Additionally, sleep quality did not significantly mediate the relationship between academic stress and unhealthy eating.

Gender analyses showed no significant difference in academic stress between males and girls ($t = 2.07$, $p = .965$, Cohen's $d = 0.088$), but males reported significantly healthier eating habits than females ($t = 1.75$, $p < .001$, Cohen's $d = 0.879$). No significant gender difference was found for sleep quality ($t = 0.42$, $p = .26$, Cohen's $d = 1.010$).

The results clearly link poor eating habits to academic stress, suggesting that nutritional treatments could reduce student stress. However, the non-significant mediation effect of sleep quality implies that other routes, such as emotional regulation or physical health, may have a bigger influence. This aligns with Yan et al. (2018), who found sleep quality did not significantly mediate the link between academic stress and depression. Furthermore, sleep's mediation function may be diminished by environmental factors. For example, in

impoverished nations like Pakistan, cultural and environmental factors including religious traditions, lengthy household duties, and collectivist family responsibilities might disrupt sleep patterns and offset the benefits of sleep in reducing stress. Park et al. (2023) demonstrated that macro-level constructs like GDP, Individualism, and Uncertainty Avoidance explain up to 55% of cross-national variation in sleep quality, underscoring how societal context dominates sleep outcomes. Similarly, research in Bangladesh indicates that extended family interactions and religious commitments shape daily rhythms and well-being (Damayanti & Zulkarnain, 2023), suggesting similar socio-cultural determinants in South Asia may attenuate sleep's mediating influence between unhealthy eating and academic stress.

Recommendations

Universities should proactively address the interconnected issues of academic stress, unhealthy eating, and poor sleep among students. To promote healthy sleep habits, institutions can offer sleep hygiene workshops that improve stress management and sleep quality (Lund et al., 2010). Comprehensive stress management programs that include mindfulness and therapy can reduce emotional eating and encourage improved coping strategies (Regehr et al., 2013). Additionally, funding nutritional education and offering healthier campus food options can significantly influence dietary decisions and mental health (El Ansari et al., 2014). Furthermore, encouraging physical exercise through easily available fitness programs may improve the quality of sleep and reduce stress (Gerber & Pühse, 2009), while gender-specific support can address unique stressors (American College Health Association, 2021).

Future research should look at how factors like socioeconomic status or cultural influences affect these connections (Bewick et al., 2010). Longitudinal studies and assessments of therapies, including sleep training, would provide additional information about fostering long-term student health and academic achievement (Davis et al., 2020).

Conclusion

The study demonstrates that, despite its importance, sleep quality does not considerably mediate the robust correlation between academic stress and unhealthy eating. Addressing academic stress with supporting treatments and promoting healthier lifestyle choices, students' physical and mental health can be improved.

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