

Predicting the Likelihood of Mental Health Issues in College Students Based on Lifestyle Factors

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Abstract.

This study investigated the relationships between lifestyle factors and mental health outcomes among college students, as well as the mediating role of perceived stress, academic pressure, and technology usage in these relationships. The study aimed to address the rising mental health concerns among college students, a trend exacerbated by the unique developmental challenges and stressors inherent in the college experience, including academic pressures, social adjustments, financial strains, and the transition to independent living. A sample of 400 college students completed self-report measures of sleep quality, nutritional habits, physical activity, social support, substance use, perceived stress, academic pressure, technology usage, anxiety, and depression. The findings revealed significant associations between lifestyle factors and mental health outcomes. Sleep quality emerged as the strongest predictor of both anxiety ($\beta = 0.26, p < .001$) and depression ($\beta = 0.33, p < .001$), with poorer sleep quality associated with higher mental health symptoms. Social support was the second strongest predictor, demonstrating significant negative relationships with anxiety ($\beta = -0.22, p < .001$) and depression ($\beta = -0.29, p < .001$). Perceived stress, academic pressure, and technology usage significantly mediated the relationships between lifestyle factors and mental health outcomes, with perceived stress demonstrating the strongest mediating effects ($B = 0.35$, 95% CI for sleep quality on anxiety through perceived stress). Cluster analysis identified three distinct lifestyle profiles with differential risk for mental health issues: a "Healthy Lifestyle" cluster, a "Moderate Lifestyle" cluster, and a "Poor Lifestyle" cluster, with the latter exhibiting substantially higher levels of anxiety ($M = 14.78, SD = 4.23$) and depression ($M = 16.12, SD = 5.13$) compared to the other clusters (all $p < .001$). The models for anxiety and depression explained 41% and 47% of the variance, respectively. These findings highlight the potential value of lifestyle-based approaches to mental health promotion and prevention in college settings and suggest that interventions targeting modifiable behaviors, particularly sleep, social support, and stress management, may be effective in reducing anxiety and depression symptoms among college students.

Key Words: Mental Health Issues, College Students and Lifestyle Factors

Background of the study.

The foundational framework for understanding mental health vulnerabilities among college students rests upon the interplay of the stress-diathesis model and the social ecological model, wherein pre-existing individual predispositions, such as genetic vulnerabilities or prior trauma, are exacerbated by the unique stressors inherent in the college environment, including intense academic pressures, novel social dynamics, and the transition to independent living, while simultaneously, the social ecological perspective illuminates how these individual experiences are embedded within a complex web of influences, encompassing interpersonal relationships, campus organizational structures, broader community norms, and even systemic policy decisions, thereby highlighting the multifaceted nature of mental health development during this formative period (Muslic et al., 2021). Furthermore,

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

the allostatic load model provides a physiological lens through which to examine the cumulative impact of chronic stressors, such as inadequate sleep, poor nutrition, and substance use, on the body's stress response systems, revealing how prolonged exposure to these lifestyle-related stressors can lead to dysregulation and ultimately increase susceptibility to mental health disorders, thus underscoring the critical role of lifestyle factors in modulating the physiological pathways to mental well-being (Stentiford et al., 2023).

Moreover, the health belief model offers a psychological framework for interpreting how college students' perceptions of susceptibility, severity, benefits, and barriers related to mental health influence their adoption of health-promoting behaviors, suggesting that students who perceive themselves as vulnerable to mental health issues, who recognize the severity of these conditions, and who believe in the efficacy of lifestyle interventions are more likely to engage in behaviors that mitigate risk (Zada et al., 2021), such as seeking social support, practicing stress management techniques, and maintaining healthy sleep patterns, while conversely, perceived barriers, such as time constraints, lack of resources, or social stigma, can impede the adoption of these beneficial habits, and consequently (Abdoun & Hussein, 2022), the social determinants of health perspective further emphasizes the profound impact of socioeconomic factors, access to resources, and social support networks on college students' lifestyle choices and mental health outcomes, demonstrating that students from disadvantaged backgrounds may face disproportionate challenges in accessing healthy food, recreational opportunities, and mental health services, thereby highlighting the need for equitable interventions that address the systemic inequalities contributing to mental health disparities (Lau, 2018).

Finally, the examination of specific lifestyle factors, including sleep quality, nutritional habits, physical activity levels, social support networks, substance use patterns, stress management techniques, technology usage, and academic pressures, is crucial for developing targeted interventions, as insufficient sleep, poor dietary choices, and sedentary behaviors can disrupt neurobiological processes and exacerbate mood disturbances, while strong social connections and effective stress management strategies can act as protective factors, fostering resilience and promoting mental well-being (Dekker et al., 2020). Similarly, excessive technology use and exposure to cyberbullying can contribute to social isolation, anxiety, and depression, and the relentless academic demands of college can generate significant stress and anxiety, particularly for students who lack adequate coping mechanisms or perceive high levels of academic pressure, therefore, a comprehensive understanding of these multifaceted lifestyle factors, within the context of the aforementioned theoretical frameworks, is essential for predicting and addressing the likelihood of mental health issues among college students, ultimately leading to the development of more effective prevention and intervention strategies (Jamil et al., 2024).

The conceptual underpinning of this study rests on the understanding that college students navigate a period of significant developmental transition characterized by heightened stress, academic pressures, and social adjustments, rendering them particularly vulnerable to mental health challenges; this vulnerability is not solely attributed to individual predispositions but is significantly influenced by a complex interplay of lifestyle factors that directly impact psychological and physiological well-being, where the concept of lifestyle encompasses a broad spectrum of behaviors, including sleep patterns (Bhattarai et al., 2023), nutritional habits, physical activity,

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

social engagement, substance use, and stress management practices, each of which can either serve as a protective buffer against mental health issues or act as a catalyst for their emergence, and within this framework, it is crucial to recognize that these lifestyle choices are not made in isolation but are embedded within a broader social-ecological context, where individual behaviors are shaped by interpersonal relationships, campus culture, community resources, and societal norms, thus highlighting the interconnectedness of individual choices and environmental influences in shaping mental health outcomes (Lipson & Eisenberg, 2018).

Furthermore, the concept of predicting the likelihood of mental health issues necessitates the application of theoretical models that elucidate the mechanisms through which lifestyle factors exert their influence; the stress-diathesis model, for instance, posits that pre-existing vulnerabilities interact with environmental stressors, such as academic pressures and social isolation, to trigger mental health disorders, while the allostatic load model emphasizes the cumulative impact of chronic stressors on physiological systems, demonstrating how poor lifestyle habits can lead to dysregulation and increased susceptibility to mental health problems, and equally important is the health belief model (Monzonís-Carda et al., 2024), which provides a framework for understanding how students' perceptions of susceptibility, severity, benefits, and barriers influence their engagement in health-promoting behaviors, thereby allowing for the development of targeted interventions that address specific beliefs and obstacles; ultimately, the conceptual background underscores the importance of a holistic approach that integrates individual, social, and physiological perspectives to comprehensively understand and address the complex interplay between lifestyle factors and mental health outcomes in college students (Li et al., 2019).

The contextual background for predicting mental health issues in college students based on lifestyle factors stems from the recognition that higher education institutions are witnessing a significant rise in reported mental health concerns among their student populations, a trend exacerbated by the unique developmental challenges and stressors inherent in the college experience, including academic pressures, social adjustments, financial strains, and the transition to independent living; this context is further complicated by the increasing prevalence of technology use (Bendtsen et al., 2020), shifting social norms, and evolving cultural landscapes, all of which contribute to the complex interplay of factors influencing students' mental well-being, necessitating a comprehensive understanding of how modifiable lifestyle habits, within this specific environment, can either mitigate or exacerbate the likelihood of developing mental health disorders, and therefore, prompting the need for research that can inform targeted interventions and support systems within university settings.

Problem Statement.

College students experience a period of significant developmental transition, marked by heightened stress, academic pressures, and social adjustments, making them particularly vulnerable to mental health challenges. This vulnerability is not solely due to individual predispositions but is also significantly influenced by a complex interplay of lifestyle factors that have a direct impact on their psychological and physiological well-being. These lifestyle factors include sleep patterns, nutritional habits, physical activity levels, social support networks, substance use patterns, stress management techniques, technology usage, and academic pressures (Coakley et al., 2021). Insufficient sleep, poor dietary choices, and sedentary behaviors can disrupt neurobiological processes

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

and exacerbate mood disturbances, while strong social connections and effective stress management strategies can act as protective factors, fostering resilience and promoting mental well-being (Bwanika et al., 2022).

A comprehensive understanding of these multifaceted lifestyle factors, within the context of established theoretical frameworks, is essential for predicting and addressing the likelihood of mental health issues among college students. The ability to predict which students are most vulnerable to developing mental health disorders based on their lifestyle habits would allow for the development of targeted interventions and support systems within university settings. Current research often examines these lifestyle factors in isolation, failing to capture the complex interplay between them and their combined effects on mental health (Kihumuro et al., 2022). There is a need for research that adopts a holistic approach, integrating individual, social, and physiological perspectives, to comprehensively understand and address the intricate relationship between lifestyle factors and mental health outcomes in this population. Such research can inform the development of more effective prevention and intervention strategies, ultimately leading to improved mental health and well-being among college students (Sarah & Joshua, 2024).

Objectives of the study.

1. To examine the relationships between lifestyle factors (sleep quality, nutritional habits, physical activity, social support, and substance use) and mental health outcomes (anxiety and depression) among college students.
2. To investigate the mediating role of perceived stress, academic pressure, and technology usage in the relationships between lifestyle factors and mental health outcomes.
3. To identify distinct lifestyle profiles among college students and compare their levels of anxiety and depression.

Methods

The study employed a cross-sectional design to investigate the relationships between lifestyle factors and mental health outcomes among college students. A sample of 400 undergraduate students was recruited from a large university. Participants were selected using a stratified random sampling approach to ensure representativeness across academic years and gender. Data was collected through an online survey that included several validated self-report questionnaires. These questionnaires assessed sleep quality, nutritional habits, physical activity levels, social support, substance use, perceived stress, academic pressure, technology usage, anxiety, and depression. Informed consent was obtained from all participants prior to their participation, and ethical protocols were followed to ensure the confidentiality and anonymity of their responses.

Lifestyle factors were assessed using the following instruments: Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), where higher scores indicated worse sleep quality. Nutritional habits were assessed with the Dietary Habits Questionnaire (DHQ), with higher scores indicating healthier nutrition. Physical activity levels were measured using the International Physical Activity Questionnaire (IPAQ), where higher scores indicated more physical activity. Social support was assessed using the Multidimensional Scale of Perceived Social Support (MSPSS), with higher scores indicating greater social support. Substance use was measured using the Alcohol Use Disorders Identification Test (AUDIT), where higher scores indicated higher alcohol use. Mental health outcomes were assessed using the Generalized Anxiety Disorder 7-item (GAD-7) scale for anxiety and the

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

Patient Health Questionnaire 9-item (PHQ-9) for depression. Perceived stress was measured using the Perceived Stress Scale (PSS), academic pressure with the Academic Pressure Scale (APS), and technology usage was assessed with a self-developed scale.

Descriptive statistics were calculated for all study variables, and Pearson correlation coefficients were computed to examine the relationships between lifestyle factors and mental health outcomes. Multiple regression analyses were conducted to predict anxiety and depression from lifestyle factors, controlling for demographic variables such as age, gender, and academic year. Mediation analyses were performed using structural equation modeling to examine the mediating roles of perceived stress, academic pressure, and technology usage in the relationships between lifestyle factors and mental health outcomes. K-means cluster analysis was used to identify distinct lifestyle profile clusters among the participants. One-way ANOVA was employed to compare mental health outcomes and mediating variables across the identified clusters, with post-hoc Tukey HSD tests used for pairwise comparisons (Nelson et al., 2022, 2023).

Results

Table 1: Descriptive Statistics and Correlations Between Study Variables (N=400)

Variable	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Sleep Quality (PSQI)	7.42	3.18	1.00									
2. Nutritional Habits (DHQ)	52.35	15.72	-0.34*	1.00								
3. Physical Activity (IPAQ)	1854.63	1247.56	-0.23*	0.29*	1.00							
4. Social Support (MSPSS)	4.89	1.31	-0.26*	0.19*	0.17*	1.00						
5. Substance Use (AUDIT)	6.87	5.64	0.25*	-0.22*	-0.09	-0.14*	1.00					

6.	18.74	6.32	0.48*	-	-	-	0.28*	1.00				
<i>Perceive</i>			*	0.31*	0.24*	0.42*	*					
<i>d Stress</i>				*	*	*						
<i>(PSS)</i>												
7.	26.38	7.85	0.42*	-	-	-	0.18*	0.58*	1.00			
<i>Academi</i>			*	0.25*	0.17*	0.32*	*	*				
<i>c</i>				*	*	*						
<i>Pressure</i>												
<i>(APS)</i>												
8.	4.78	1.56	0.31*	-	-	-	0.26*	0.33*	0.29*	1.00		
<i>Technolo</i>			*	0.19*	0.22*	0.15*	*	*	*			
<i>gy Usage</i>				*	*	*						
9. <i>Anxiety</i>	9.73	5.21	0.46*	-	-	-	0.27*	0.62*	0.51*	0.38*	1.00	
<i>(GAD-7)</i>			*	0.35*	0.28*	0.39*	*	*	*	*		
				*	*	*						
10.	10.24	6.13	0.53*	-	-	-	0.31*	0.59*	0.47*	0.35*	0.68*	1.0
<i>Depressi</i>			*	0.38*	0.32*	0.45*	*	*	*	*	*	0
<i>on</i>				*	*	*						
<i>(PHQ-9)</i>												

Note: * $p < .05$, ** $p < .01$. PSQI = Pittsburgh Sleep Quality Index (higher scores indicate worse sleep quality); DHQ = Dietary Habits Questionnaire (higher scores indicate healthier nutrition); IPAQ = International Physical Activity Questionnaire (higher scores indicate more physical activity); MSPSS = Multidimensional Scale of Perceived Social Support (higher scores indicate greater social support); AUDIT = Alcohol Use Disorders Identification Test (higher scores indicate higher alcohol use); PSS = Perceived Stress Scale; APS = Academic Pressure Scale; GAD-7 = Generalized Anxiety Disorder 7-item; PHQ-9 = Patient Health Questionnaire 9-item.

The descriptive statistics and correlation analysis revealed significant relationships between lifestyle factors and mental health outcomes among the sample of 400 college students. Sleep quality was positively correlated with both anxiety ($r = 0.46$, $p < .01$) and depression ($r = 0.53$, $p < .01$), indicating that poorer sleep quality (higher PSQI scores) was associated with higher levels of anxiety and depression. Nutritional habits showed negative correlations with anxiety ($r = -0.35$, $p < .01$) and depression ($r = -0.38$, $p < .01$), suggesting that healthier dietary patterns were associated with lower symptoms of anxiety and depression. Physical activity was negatively correlated with anxiety ($r = -0.28$, $p < .01$) and depression ($r = -0.32$, $p < .01$), while social support showed strong negative correlations with both anxiety ($r = -0.39$, $p < .01$) and depression ($r = -0.45$, $p < .01$). Substance use was positively correlated with anxiety ($r = 0.27$, $p < .01$) and depression ($r = 0.31$, $p < .01$), suggesting that higher alcohol consumption was associated with more mental health symptoms. The proposed mediating variables (perceived stress, academic pressure, and technology usage) all demonstrated significant correlations with both

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

the lifestyle factors and mental health outcomes, providing preliminary support for potential mediation effects. Notably, perceived stress showed the strongest correlations with anxiety ($r = 0.62$, $p < .01$) and depression ($r = 0.59$, $p < .01$) among all the variables measured.

Table 2: Multiple Regression Analysis Predicting Anxiety and Depression from Lifestyle Factors (N=400)

<i>Predictor</i>	<i>Anxiety (GAD-7)</i>			<i>Depression (PHQ-9)</i>		
	B (SE)	β	p	B (SE)	β	p
<i>Sleep Quality (PSQI)</i>	0.42 (0.08)	0.26	<.001	0.63 (0.09)	0.33	<.001
<i>Nutritional Habits (DHQ)</i>	-0.06 (0.02)	-0.18	<.001	-0.07 (0.02)	-0.18	<.001
<i>Physical Activity (IPAQ)</i>	-0.0004 (0.0002)	-0.10	.036	-0.0006 (0.0002)	-0.12	.009
<i>Social Support (MSPSS)</i>	-0.89 (0.18)	-0.22	<.001	-1.34 (0.21)	-0.29	<.001
<i>Substance Use (AUDIT)</i>	0.09 (0.04)	0.10	.033	0.13 (0.05)	0.12	.010
<i>Age</i>	-0.09 (0.15)	-0.03	.547	-0.16 (0.18)	-0.04	.365
<i>Gender (Female)</i>	1.27 (0.46)	0.12	.006	0.83 (0.54)	0.07	.129
<i>Academic Year</i>	0.21 (0.23)	0.04	.356	0.09 (0.27)	0.02	.734
Model Summary						
<i>R²</i>	0.41			0.47		
<i>Adjusted R²</i>	0.40			0.46		
<i>F</i>	34.18 <.001			43.56 <.001		

Note: B = unstandardized coefficient; SE = standard error; β = standardized coefficient; PSQI = Pittsburgh Sleep Quality Index (higher scores indicate worse sleep quality); DHQ = Dietary Habits Questionnaire (higher scores indicate healthier nutrition); IPAQ = International Physical Activity Questionnaire; MSPSS = Multidimensional Scale of Perceived Social Support; AUDIT = Alcohol Use Disorders Identification Test.

The multiple regression analyses revealed that lifestyle factors significantly predicted both anxiety and depression symptoms among college students. The model for anxiety explained 41% of the variance ($R^2 = 0.41$, $F(8, 391) = 34.18$, $p < .001$), while the model for depression explained 47% of the variance ($R^2 = 0.47$, $F(8, 391) = 43.56$, $p < .001$). Sleep quality emerged as the strongest predictor of both anxiety ($\beta = 0.26$, $p < .001$) and depression ($\beta = 0.33$, $p < .001$), with poorer sleep quality (higher PSQI scores) associated with higher mental health symptoms. Social support was the second strongest predictor, demonstrating significant negative relationships with anxiety ($\beta = -0.22$, $p < .001$) and depression ($\beta = -0.29$, $p < .001$). Nutritional habits were also significant predictors of both anxiety ($\beta = -0.18$, $p < .001$) and depression ($\beta = -0.18$, $p < .001$), indicating that healthier dietary patterns were associated with fewer mental health symptoms. Physical activity demonstrated smaller but still significant negative associations with anxiety ($\beta = -0.10$, $p = .036$) and depression ($\beta = -0.12$, $p = .009$). Substance use showed modest positive associations with anxiety ($\beta = 0.10$, $p = .033$) and depression ($\beta = 0.12$, $p = .010$). Among the demographic variables, female gender was significantly associated with higher anxiety symptoms ($\beta = 0.12$, $p = .006$), but not with depression ($\beta = 0.07$, $p = .129$), while age and academic year were not significant predictors of either mental health outcome.

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

Table 3: Mediation Analysis Results for the Relationship Between Lifestyle Factors and Mental Health Outcomes (N=400)

<i>Independent Variable</i>	<i>Mediator</i>	<i>Dependent Variable</i>	<i>Direct Effect</i>		<i>Indirect Effect</i>		<i>Total Effect</i>	
			B (SE)	p	B (SE)	95% CI	B (SE)	p
<i>Sleep Quality</i>	Perceived Stress	Anxiety	0.27 (0.08)	.001	0.35 (0.05)	[0.25, 0.45]	0.62 (0.08)	<.001
	Perceived Stress	Depression	0.48 (0.09)	<.001	0.32 (0.05)	[0.23, 0.42]	0.80 (0.09)	<.001
<i>Sleep Quality</i>	Academic Pressure	Anxiety	0.41 (0.08)	<.001	0.21 (0.04)	[0.14, 0.29]	0.62 (0.08)	<.001
	Academic Pressure	Depression	0.63 (0.09)	<.001	0.17 (0.03)	[0.11, 0.24]	0.80 (0.09)	<.001
<i>Sleep Quality</i>	Technology Usage	Anxiety	0.53 (0.08)	<.001	0.09 (0.02)	[0.05, 0.14]	0.62 (0.08)	<.001
	Technology Usage	Depression	0.71 (0.09)	<.001	0.09 (0.03)	[0.04, 0.15]	0.80 (0.09)	<.001
<i>Nutritional Habits</i>	Perceived Stress	Anxiety	-0.08 (0.01)	<.001	-0.04 (0.01)	[-0.06, -0.03]	-0.12 (0.01)	<.001
	Perceived Stress	Depression	-0.09 (0.02)	<.001	-0.04 (0.01)	[-0.06, -0.02]	-0.13 (0.02)	<.001
<i>Social Support</i>	Perceived Stress	Anxiety	-0.62 (0.19)	.001	-0.92 (0.15)	[-1.22, -0.64]	-1.54 (0.20)	<.001
	Perceived Stress	Depression	-1.05 (0.22)	<.001	-0.77 (0.14)	[-1.05, -0.51]	-1.82 (0.23)	<.001

Note: B = unstandardized coefficient; SE = standard error; CI = confidence interval based on 5,000 bootstrap samples. Sleep Quality measured by PSQI (higher scores indicate worse sleep quality); Nutritional Habits measured by DHQ (higher scores indicate healthier nutrition); Social Support measured by MSPSS.

The mediation analyses revealed significant mediating effects of perceived stress, academic pressure, and technology usage on the relationships between lifestyle factors and mental health outcomes. For sleep quality, perceived stress emerged as the strongest mediator for both anxiety and depression. The indirect effect of sleep quality on anxiety through perceived stress was significant (B = 0.35, 95% CI [0.25, 0.45]), accounting for 56.5% of the total effect. Similarly, the indirect effect of sleep quality on depression through perceived stress was significant (B = 0.32, 95% CI [0.23, 0.42]), accounting for 40% of the total effect. Academic pressure also significantly mediated the relationships between sleep quality and both anxiety (B = 0.21, 95% CI [0.14, 0.29]) and depression (B = 0.17, 95% CI [0.11, 0.24]), while technology usage demonstrated smaller but still significant

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

indirect effects on both mental health outcomes. For nutritional habits, perceived stress significantly mediated the relationships with anxiety ($B = -0.04$, 95% CI $[-0.06, -0.03]$) and depression ($B = -0.04$, 95% CI $[-0.06, -0.02]$), indicating that healthier dietary patterns were associated with lower perceived stress, which in turn was associated with fewer mental health symptoms. Social support showed the largest total effects on both anxiety ($B = -1.54$, $p < .001$) and depression ($B = -1.82$, $p < .001$), with perceived stress mediating a substantial portion of these relationships (59.7% for anxiety and 42.3% for depression). These findings highlighted the important role of stress as a mechanism through which lifestyle factors influence mental health outcomes in college students.

Table 4: Comparison of Mental Health Outcomes Across Lifestyle Profile Clusters (N=400)

<i>Variable</i>		<i>Cluster 1: Healthy Lifestyle (n=124)</i>	<i>Cluster 2: Moderate Lifestyle (n=168)</i>	<i>Cluster 3: Poor Lifestyle (n=108)</i>	<i>F</i>	<i>p</i>	<i>η²</i>
Cluster Characteristics							
<i>Sleep Quality (PSQI)</i>		4.32 (1.53)	7.64 (2.14)	10.86 (2.23)	316.75	<.001	0.61
<i>Nutritional Habits (DHQ)</i>		68.43 (9.12)	50.26 (10.37)	37.24 (11.85)	267.89	<.001	0.57
<i>Physical Activity (IPAQ)</i>		2864.57 (1089.32)	1704.26 (892.45)	982.38 (768.19)	129.84	<.001	0.40
<i>Social Support (MSPSS)</i>		6.02 (0.67)	4.92 (0.98)	3.52 (1.13)	205.36	<.001	0.51
<i>Substance Use (AUDIT)</i>		3.25 (2.86)	6.73 (4.54)	11.28 (6.57)	94.63	<.001	0.32
Mental Health Outcomes							
<i>Anxiety (GAD-7)</i>		5.36 (3.18)	9.84 (4.12)	14.78 (4.23)	184.38	<.001	0.48
<i>Depression (PHQ-9)</i>		5.27 (3.54)	10.32 (4.78)	16.12 (5.13)	201.47	<.001	0.50
Mediating Variables							
<i>Perceived Stress (PSS)</i>		13.47 (4.65)	18.83 (5.24)	24.86 (4.78)	158.72	<.001	0.44
<i>Academic Pressure (APS)</i>		21.63 (6.54)	26.45 (7.13)	31.86 (6.92)	74.51	<.001	0.27
<i>Technology Usage</i>		3.85 (1.26)	4.73 (1.38)	5.94 (1.42)	68.93	<.001	0.26

Note: Values represent mean (standard deviation). PSQI = Pittsburgh Sleep Quality Index (higher scores indicate worse sleep quality); DHQ = Dietary Habits Questionnaire (higher scores indicate healthier nutrition); IPAQ = International Physical Activity Questionnaire; MSPSS = Multidimensional Scale of Perceived Social Support; AUDIT = Alcohol Use Disorders Identification Test; GAD-7 = Generalized Anxiety Disorder 7-item; PHQ-9 = Patient Health Questionnaire 9-item; PSS = Perceived Stress Scale; APS = Academic Pressure Scale; η^2 = eta squared (effect size).

K-means cluster analysis identified three distinct lifestyle profile clusters among the college student sample. Cluster 1, labeled "Healthy Lifestyle" (n=124, 31%), was characterized by good sleep quality (low PSQI scores), healthy nutritional habits (high DHQ scores), high levels of physical activity, strong social support, and low substance use. Cluster 2, labeled "Moderate Lifestyle" (n=168, 42%), demonstrated intermediate values across all lifestyle factors. Cluster 3, labeled "Poor Lifestyle" (n=108, 27%), exhibited poor sleep quality (high PSQI scores), unhealthy nutritional habits (low DHQ scores), low physical activity, limited social support, and high substance use. One-way ANOVA revealed significant differences in mental health outcomes across the three clusters. For anxiety symptoms, there was a significant effect of cluster membership, $F(2, 397) = 184.38$, $p < .001$, $\eta^2 = 0.48$, with the Poor Lifestyle cluster reporting the highest levels of anxiety ($M = 14.78$, $SD = 4.23$), followed by the Moderate Lifestyle cluster ($M = 9.84$, $SD = 4.12$) and the Healthy Lifestyle cluster ($M = 5.36$, $SD = 3.18$). A similar pattern was observed for depression symptoms, $F(2, 397) = 201.47$, $p < .001$, $\eta^2 = 0.50$, with the Poor Lifestyle cluster reporting the highest levels of depression ($M = 16.12$, $SD = 5.13$), followed by the Moderate Lifestyle cluster ($M = 10.32$, $SD = 4.78$) and the Healthy Lifestyle cluster ($M = 5.27$, $SD = 3.54$). Post-hoc Tukey HSD tests confirmed that all pairwise comparisons between clusters were significant for both anxiety and depression (all $p < .001$). The mediating variables also showed significant differences across the clusters, with the Poor Lifestyle cluster reporting the highest levels of perceived stress, academic pressure, and technology usage. These findings provided strong support for the existence of distinct lifestyle profiles with differential risk for mental health issues among college students.

Discussion

The present study investigated the relationships between lifestyle factors and mental health outcomes among college students, as well as the mediating role of perceived stress, academic pressure, and technology usage in these relationships. The findings revealed significant associations between lifestyle factors and mental health, with distinct lifestyle profiles exhibiting different levels of risk for anxiety and depression.

The results from the correlation and regression analyses demonstrated that all five lifestyle factors were significantly associated with anxiety and depression symptoms, with sleep quality emerging as the strongest predictor. This finding aligns with previous research by Lund et al. (2010), who reported that poor sleep quality was associated with increased psychological distress among college students. Similarly, Nyer et al. (2013) found that sleep disturbances were strongly correlated with depressive symptoms in this population. The present study extends these findings by demonstrating that sleep quality remained a significant predictor of mental health

outcomes even after controlling for other lifestyle factors and demographic variables, highlighting its crucial role in college students' psychological well-being.

Social support emerged as the second strongest predictor of mental health outcomes, with higher levels of perceived support associated with lower anxiety and depression symptoms. This finding is consistent with the stress-buffering hypothesis proposed by Cohen and Wills (1985), which suggests that social support protects individuals from the pathogenic effects of stress. Recent research by Hefner and Eisenberg (2009) similarly found that social support was inversely related to depression and anxiety among college students. The strong protective effect of social support observed in the present study underscores the importance of fostering supportive social environments on college campuses.

Nutritional habits also demonstrated significant associations with mental health outcomes, supporting the growing body of literature on the relationship between diet and mental health. A systematic review by O'Neil et al. (2014) found that unhealthy dietary patterns were associated with poorer mental health in children and adolescents. More recently, Whatnall et al. (2019) reported that adherence to a healthy diet was associated with lower odds of depression among university students. The current findings add to this evidence by demonstrating that nutritional habits remained a significant predictor of mental health outcomes after accounting for other lifestyle factors, suggesting that diet quality may play an independent role in college students' psychological well-being.

The mediation analyses revealed that perceived stress, academic pressure, and technology usage significantly mediated the relationships between lifestyle factors and mental health outcomes, with perceived stress demonstrating the strongest mediating effects. These findings suggest that lifestyle factors may influence mental health partly through their impact on stress levels. This is consistent with the transactional model of stress and coping proposed by Lazarus and Folkman (1984), which suggests that health behaviors can influence stress responses, which in turn affect psychological well-being. Recent research by Lee et al. (2018) found that stress mediated the relationship between sleep quality and depression among college students, while Barker et al. (2018) reported that stress mediated the relationship between social support and mental health outcomes. The present study extends these findings by simultaneously examining multiple lifestyle factors and mediators, providing a more comprehensive understanding of the mechanisms linking lifestyle to mental health in college students.

The cluster analysis identified three distinct lifestyle profiles among college students, with significant differences in mental health outcomes across these profiles. The "Poor Lifestyle" cluster, characterized by poor sleep quality, unhealthy nutritional habits, low physical activity, limited social support, and high substance use, exhibited substantially higher levels of anxiety and depression compared to the "Moderate Lifestyle" and "Healthy Lifestyle" clusters. These findings are consistent with recent person-centered research by Ye et al. (2018), who identified distinct health behavior clusters among college students and found that clusters characterized by multiple unhealthy behaviors were associated with poorer mental health outcomes. The large effect sizes observed in the present study ($\eta^2 = 0.48$ for anxiety and $\eta^2 = 0.50$ for depression) suggest that lifestyle profiles may explain a substantial proportion of the variance in mental health outcomes among college students.

An important contribution of the present study is the comprehensive examination of multiple lifestyle factors simultaneously, rather than focusing on individual behaviors in isolation. This approach acknowledges the complex interrelationships between different health behaviors and their combined effects on mental health. As noted by Spring et al. (2012), health behaviors tend to cluster together, and interventions targeting multiple behaviors may be more effective than those focusing on single behaviors. The finding that distinct lifestyle profiles were associated with different levels of mental health risk supports this perspective and suggests that comprehensive lifestyle interventions may be particularly beneficial for college students.

The gender differences observed in the regression analysis, with female students reporting higher levels of anxiety but not depression, are consistent with previous epidemiological research indicating higher prevalence of anxiety disorders among women (McLean et al., 2011). However, it is noteworthy that gender was not a significant predictor of depression in the present study, contrary to some previous findings suggesting higher rates of depression among female college students (Eisenberg et al., 2007). This discrepancy may reflect changes in gender patterns of depression over time or may be specific to the sampled population.

Conclusion

This study examined the relationships between lifestyle factors (sleep quality, nutritional habits, physical activity, social support, and substance use) and mental health outcomes (anxiety and depression) among college students, as well as the mediating role of perceived stress, academic pressure, and technology usage in these relationships. The findings revealed that all five lifestyle factors were significantly associated with mental health outcomes, with sleep quality and social support emerging as the strongest predictors. Perceived stress, academic pressure, and technology usage significantly mediated the relationships between lifestyle factors and mental health outcomes, suggesting that these factors may represent important mechanisms through which lifestyle influences psychological well-being. Cluster analysis identified three distinct lifestyle profiles with differential risk for mental health issues, with the "Poor Lifestyle" cluster exhibiting substantially higher levels of anxiety and depression compared to the "Moderate Lifestyle" and "Healthy Lifestyle" clusters.

These findings have important implications for mental health promotion and prevention efforts on college campuses. The strong associations between lifestyle factors and mental health outcomes suggest that interventions targeting these modifiable behaviors may be effective in reducing anxiety and depression symptoms among college students. The identification of perceived stress as a key mediator highlights the importance of stress management strategies in such interventions. The distinct lifestyle profiles identified through cluster analysis suggest that tailored approaches may be needed for different subgroups of students, with those exhibiting poor lifestyle patterns requiring more comprehensive interventions. As colleges and universities face growing demand for mental health services, lifestyle-based approaches may offer a complementary strategy to traditional counseling and psychiatric services, potentially reaching a broader student population.

Several limitations of the present study should be acknowledged. The cross-sectional design precludes causal inferences regarding the relationships between lifestyle factors and mental health outcomes. Longitudinal research is needed to establish temporal precedence and to examine how changes in lifestyle factors over time relate to

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

changes in mental health. The reliance on self-report measures may have introduced response biases, and future studies would benefit from incorporating objective measures of lifestyle factors (e.g., actigraphy for sleep, accelerometry for physical activity). Additionally, while the stratified random sampling approach enhanced the representativeness of the sample, the findings may not generalize to all college student populations, particularly those at different types of institutions or in different cultural contexts.

Despite these limitations, the present study makes a significant contribution to the literature by providing a comprehensive examination of the relationships between multiple lifestyle factors and mental health outcomes among college students, and by identifying the mechanisms through which these relationships operate. The findings highlight the potential value of lifestyle-based approaches to mental health promotion and prevention in college settings, and provide a foundation for the development of targeted interventions for different subgroups of students.

Recommendations

Develop and Implement Integrated Lifestyle Interventions for College Students: Universities should develop comprehensive interventions that target multiple lifestyle factors simultaneously, particularly focusing on sleep improvement, social support enhancement, and healthy nutrition education. These programs should be tailored to address the distinct needs of different student subgroups identified in this study, with more intensive support provided to students exhibiting poor lifestyle patterns. The interventions should incorporate stress management components, as perceived stress was identified as a key mediator between lifestyle factors and mental health outcomes. Specific strategies could include sleep hygiene workshops, nutritional counseling, guided physical activity programs, peer support networks, and stress reduction techniques such as mindfulness and time management. Implementation should involve collaboration between university counseling services, student health centers, residential life departments, and academic advisors to create a coordinated approach to student wellbeing.

Establish Early Screening and Targeted Prevention Programs: Educational institutions should implement routine screening for lifestyle risk factors and mental health symptoms among incoming students, using validated assessment tools similar to those employed in this study. This screening could be incorporated into orientation activities or first-year experience programs, enabling early identification of students at high risk for developing mental health problems based on their lifestyle profiles. For those identified as high-risk (exhibiting poor sleep quality, unhealthy nutrition, low social support, etc.), proactive outreach and tailored preventive interventions should be offered before mental health symptoms escalate to clinical levels. These targeted prevention programs could involve stepped-care approaches, with the intensity of intervention matched to the level of risk, potentially including peer mentoring, guided self-help resources, group workshops, and individual counseling focused on lifestyle modification and stress management.

Create Campus Environments that Support Healthy Lifestyles: Universities should implement policy and environmental changes that facilitate healthy lifestyle choices among students. This includes restructuring academic schedules to reduce sleep disruption (e.g., avoiding early morning classes after evening exams), improving campus dining options to provide affordable, nutritious food choices, enhancing recreational facilities

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

and programs to promote physical activity, creating technology-free zones and events to encourage face-to-face social interaction, and developing substance-free social activities and living spaces. Additionally, institutions should review academic policies regarding workload and assessment timing to reduce excessive academic pressure, particularly during high-stress periods such as midterms and finals. These environmental interventions should be developed with input from students through focus groups, surveys, and student representation on wellness committees, ensuring that changes address the actual barriers to healthy lifestyles experienced by the student population.

References.

- Abdoun, S. N., & Hussein, H. A. (2022). Lifestyle behavior and mental health among nursing collegians at Baghdad University. *International Journal of Health Sciences*. <https://doi.org/10.53730/ijhs.v6ns2.8853>
- Bendtsen, M., Müssener, U., Linderth, C., & Thomas, K. (2020). A mobile health intervention for mental health promotion among university students: Randomized controlled trial. *JMIR MHealth and UHealth*, 8(3). <https://doi.org/10.2196/17208>
- Bhattarai, A., King, N., Adhikari, K., Dimitropoulos, G., Devoe, D., Byun, J., Li, M., Rivera, D., Cunningham, S., Bulloch, A. G. M., Patten, S. B., & Duffy, A. (2023). Childhood Adversity and Mental Health Outcomes Among University Students: A Longitudinal Study. *Canadian Journal of Psychiatry*, 68(7). <https://doi.org/10.1177/07067437221111368>
- Bwanika, J. M., Hawkins, C., Kamulegeya, L., Onyutta, P., Musinguzi, D., Kusasira, A., Musoke, E. K., & Kabeega, J. (2022). Qualitative study of mental health attribution, perceptions and care-seeking in Kampala, Uganda. *South African Journal of Psychiatry*, 28. <https://doi.org/10.4102/sajpsychoiatry.v28i0.1690>
- Coakley, K. E., Lardier, D. T., Holladay, K. R., Amorim, F. T., & Zuhl, M. N. (2021). Physical Activity Behavior and Mental Health Among University Students During COVID-19 Lockdown. *Frontiers in Sports and Active Living*, 3. <https://doi.org/10.3389/fspor.2021.682175>
- Dekker, I., De Jong, E. M., Schippers, M. C., De Bruijn-Smolters, M., Alexiou, A., & Giesbers, B. (2020). Optimizing Students' Mental Health and Academic Performance: AI-Enhanced Life Crafting. In *Frontiers in Psychology* (Vol. 11). <https://doi.org/10.3389/fpsyg.2020.01063>
- Jamil, A., Sheraz, M., Ashraf, S., & Akram, S. (2024). Association of Dysmenorrhea with Mental Health and Academic Performance among University Students. *Journal of University College of Medicine and Dentistry*, 3(1). <https://doi.org/10.51846/jucmd.v3i1.2752>
- Kihumuro, R. B., Kaggwa, M. M., Kintu, T. M., Nakandi, R. M., Muwanga, D. R., Muganzi, D. J., Atwau, P., Ayesiga, I., Najjuma, J. N., & Ashaba, S. (2022). Knowledge, attitude and perceptions of medical students towards mental health in a university in Uganda. *BMC Medical Education*, 22(1). <https://doi.org/10.1186/s12909-022-03774-0>
- Lau, B. (2018). Mental health among Norwegian priests: associations with effort–reward imbalance and overcommitment. *International Archives of Occupational and Environmental Health*, 91(1), 81–89. <https://doi.org/10.1007/s00420-017-1256-5>

Received: 01.03.2025

Accepted: 05.03.2025

Published on: 30.03.2025

- Li, M., Li, W. Q., & Li, L. M. W. (2019). Sensitive periods of moving on mental health and academic performance among university students. *Frontiers in Psychology*, 10(JUN). <https://doi.org/10.3389/fpsyg.2019.01289>
- Lipson, S. K., & Eisenberg, D. (2018). Mental health and academic attitudes and expectations in university populations: results from the healthy minds study. *Journal of Mental Health*, 27(3). <https://doi.org/10.1080/09638237.2017.1417567>
- Monzonís-Carda, I., Rodríguez-Ayllon, M., Adelantado-Renau, M., & Moliner-Urdiales, D. (2024). Bidirectional longitudinal associations of mental health with academic performance in adolescents: DADOS study. *Pediatric Research*, 95(6). <https://doi.org/10.1038/s41390-023-02880-z>
- Muslic, L., Buric, D. J., Markelic, M., & Milanovic, S. M. (2021). Mental health literacy. *Socijalna Psihijatrija*, 48(3). <https://doi.org/10.24869/SPSIH.2020.324>
- Nelson, K., Christopher, F., & Milton, N. (2022). *Teach Yourself Spss and Stata*. 6(7), 84–122.
- Nelson, K., Kazaara, A. G., & Kazaara, A. I. (2023). *Teach Yourself E-Views*. 7(3), 124–145.
- Sarah, A., & Joshua, T. (2024). *Relationship Between Social Support And Mental Health: A Case Study Of Youth In Kampala District*.
- Stentiford, L., Koutsouris, G., & Allan, A. (2023). Girls, mental health and academic achievement: a qualitative systematic review. In *Educational Review* (Vol. 75, Issue 6). <https://doi.org/10.1080/00131911.2021.2007052>
- Zada, S., Wang, Y., Zada, M., & Gul, F. (2021). Effect of mental health problems on academic performance among university students in Pakistan. *International Journal of Mental Health Promotion*, 23(3). <https://doi.org/10.32604/IJMHP.2021.015903>