The Impact of Sociodemographic Factors and Eating Habits on Mental Health Among College Students

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ABSTRACT

This study aimed to examine the relationships between college students' mental health and their eating habits, alongside sociodemographic variables. A multiple linear regression analysis was conducted to predict participants' perceived mental health, measured by the Total PHQ8 score, based on their eating habits, assessed via the total Healthy Eating Assessment score, and various sociodemographic variables (age, gender, academic degree, student classification, college, living arrangement, and BMI). Additionally, a multivariable logistic regression analysis was used to identify predictors of mental health disorders. The multiple linear regression analysis yielded a significant model ($F(17, 460) = 5.90$, $p < .001$, $R^2 = 0.179$). Significant predictors included gender, living arrangement, and healthy eating habits. Females reported higher PHQ8 scores, indicating poorer mental health. Living with family or friends was associated with better mental health compared to living alone. Improved healthy eating habits correlated with decreased PHQ8 scores. The logistic regression model, explaining 19.1% of the variance, identified gender, student classification, and healthy eating habits as significant predictors of mental health disorders. Female gender and second-year student classification increased the likelihood of mental health disorders, while healthier eating habits reduced this likelihood. Gender, living arrangements, and healthy eating habits significantly influence mental health among college students. These findings highlight the need for targeted mental health interventions and support systems tailored to specific student needs, particularly focusing on female students, those living alone, and promoting healthy eating behaviors. Future research should consider longitudinal designs and objective measures to further elucidate these relationships.

Keywords: Mental health, eating habits, college students, gender, living arrangement, sociodemographic variables, PHQ8, Healthy Eating Assessment.

INTRODUCTION

The transition to college life represents a critical period for young adults, marked by significant changes and challenges that can impact their physical and mental health. College students often face unique stressors such as academic pressures, social adjustments, and the shift to independent living, which can contribute to unhealthy behaviors and mental health issues[1,2]. This study aims to explore the relationships between sociodemographic factors, eating habits, and mental health among college students.

Previous research has highlighted that college students frequently adopt poor dietary patterns, characterized by high consumption of fast food, sugary beverages, and snacks, along with low intake of fruits and vegetables[3-5]. Such dietary behaviors can adversely affect physical health, leading to an increased risk of obesity, cardiovascular diseases, and metabolic disorders[6,7]. Moreover, diet quality has been linked to mental health outcomes, with evidence suggesting that unhealthy eating habits are associated with higher levels of depression and anxiety[8-10]. Conversely, a diet rich in fruits, vegetables, and whole grains is associated with better mental health and reduced risks of psychological distress[11-13].

Mental health issues among college students are a growing concern, with studies reporting high prevalence rates of depression, anxiety, and stress in this population[14-16]. Factors such as sleep disturbances, academic stress, and social isolation can exacerbate these conditions, negatively impacting students' academic performance and overall well-being[17,18]. Understanding the predictors of mental health disorders in college students is essential for developing targeted interventions and support mechanisms. Socioeconomic and demographic factors, including age, gender, academic level, and living arrangements, play a crucial role in influencing students' mental health[19-21]. Furthermore, the interplay between dietary habits and mental health underscores the need for comprehensive approaches that address both nutritional and psychological well-being[22].

This study seeks to fill the gap in the literature by examining the relationships between sociodemographic characteristics, eating habits, and mental health among college students. By identifying significant predictors of mental health disorders, this research aims to inform the development of effective interventions and policies to enhance the well-being of this vulnerable population.

METHODS

Study Design and Participants: This cross-sectional study was conducted at a university in southeastern region of Saudi Arabia to assess various dimensions of student well-being and capture key indicators pertaining to prevalent health behaviors among the student population. The study aimed to gain a deeper understanding of the mental health status of Saudi college students as it relates to their eating habits, thereby laying the foundation for targeted interventions and initiatives aimed at fostering a healthier and more supportive campus environment.

Survey Instrument: A comprehensive online survey instrument was developed by merging previously established tools, each designed to measure different aspects of health behaviors. Sociodemographic information collected included gender, age, academic degree (i.e.,

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diploma, bachelor, and graduate students), student classification (i.e., first year, second year, third year, fourth year, and fifth year or more college students), college affiliation (i.e., medical colleges, science and engineering colleges, humanities, education and administration colleges, provincial colleges, and other colleges), living arrangement (i.e., living alone, with family, with friends, and other), and Body Mass Index (BMI).

The survey aimed to evaluate multiple dimensions of student mental health and eating habits, providing insights into areas of strength and those requiring targeted intervention. The survey included the following components:

1. Healthy Eating Assessment (HEA) Scale: This scale is designed to measure dietary habits and create a comprehensive dietary profile for survey participants. This efficient tool evaluates participants' nutritional status through a ten-item scale, providing insights into their dietary behaviors.[23] The scale scores various eating habits, including the frequency of consuming fast food, fruits, vegetables, regular soda or sweet tea, high-quality proteins (e.g., beans, chicken, fish), regular snack chips or crackers, desserts/other sweets, and margarine, butter, or meat fat. Each item is scored from one (1) to five (5), with the total score ranging from 10 to 50. Higher scores indicate healthier dietary habits, while lower scores suggest less healthy eating patterns. The scale further categorizes scores into four health benefit zones: needs improvement (10-19), fair (20-29), good (30-39), and excellent (40-50). This assessment offers a clear and concise method for evaluating and understanding the nutritional behaviors of participants, making it a valuable tool for dietary analysis.
2. Patient Health Questionnaire-8 (PHQ-8): The PHQ-8 was administered to evaluate depressive symptoms and their severity among survey participants.[24] This widely used tool is a streamlined version of the Patient Health Questionnaire-9 (PHQ-9), omitting the item related to suicidal ideation to focus on the remaining eight symptoms of major depressive disorder as outlined in the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV).[25] The scale consists of eight items, each scored from zero (0) to three (3), with the total score ranging from 0 to 24. The total score is used to categorize the severity of depressive symptoms into five levels: none to minimal (0-4), mild (5-9), moderate (10-14), moderately severe (15-19), or severe (20-24). This assessment provides a clear, concise, and reliable method for evaluating the severity of depressive symptoms in participants, aiding in the identification and understanding of their mental health status.

Data Collection: The survey was distributed electronically to enrolled students. Participation was voluntary, and informed consent was obtained from all participants. The survey ensured anonymity and confidentiality to encourage honest and accurate responses.

Data Analysis: Data analyses were conducted using RStudio, encompassing both descriptive and inferential statistics to address the study's research questions. Descriptive statistics were calculated to summarize the characteristics of the participants. Inferential statistics were used to test the study's hypotheses. Firstly, multiple linear regression analyses were performed to predict participants' perceived mental health, as measured by the composite PHQ-8 score, based on their eating habits, reflected by the composite Healthy Eating Assessment score. The independent variables for these analyses included sociodemographic characteristics and Healthy Eating Assessment scores, while the dependent variable was each participant's mental health score, measured by the PHQ-8 scale. Secondly, multiple logistic regression was utilized to determine whether sociodemographic variables and eating habits could predict college students' mental health status. In this model, a dummy variable was created with a value of "1" if participants reported a mental health disorder and "0" if they did not. The independent variables included participants' sociodemographic characteristics and eating habits, while the dependent variable was the reported mental health status based on the PHQ-8 scale. A probability level of $< .05$ was used to determine statistical significance for all analyses. This robust analytical approach provided a comprehensive understanding of the relationship between dietary habits and mental health among college students, highlighting key sociodemographic factors influencing these outcomes.

Ethical Considerations: The study received approval from the Institutional Review Board (IRB) of the institution. All procedures involving human participants adhered to the ethical standards of the institutional research committee and comparable ethical guidelines.

By incorporating these tools into a comprehensive survey instrument, the study achieved a holistic understanding of the interplay between student mental health and their eating habits. These insights are invaluable for developing targeted interventions and initiatives aimed at promoting student well-being in postsecondary institutions.

RESULTS

Participant Characteristics

A total of 478 college students participated in the survey, with an average age of 20.95 years (SD = 2.69). Of these, 245 (51.3%) were female, and 430 (90%) were pursuing bachelor's degrees. Additionally, a significant majority (80.8%) lived with their immediate family members, including a spouse, parents, children, and/or siblings. In terms of academic classification, 64.9% of the students were in their first, second, or third year of study. A plurality of participants 32% (153 students) were enrolled in science and engineering colleges. Participants' average Body Mass Index (BMI) was 23.30 (SD = 6.30). For a detailed breakdown of participant characteristics, refer to Table 1.

Participants' Eating Habits

The survey results revealed a wide range of eating habits among the participants. A significant portion, 29%, rated their healthy eating habits as poor, while only 6.3% considered them excellent. Fast food was consumed 2-3 times per day by 43.3% of participants, and 33.3% reported drinking sugar-sweetened beverages with the same frequency. Regular snack chips or crackers were most commonly consumed once per day by 44.4%, and sweets were eaten 4-5 times daily by 40.2%. Fruit and vegetable intake was generally low, with 41% consuming less than one serving of fruit and 36.4% eating one serving of vegetables daily. Dairy consumption was moderate, with 32.6% having dairy products once a day. The use of added fats was minimal, with 46% using some amount. Meat, fish, or beans were eaten once daily by 36.4% of participants, reflecting varied dietary patterns across the group. The overall healthy eating assessment indicated that 54.4% of participants exhibited good or excellent nutritional behaviors over the past seven days. The average total score of health eating habits for participants in this survey was 29.7 30 (SD = 4.88), which falls within the fair category. For a detailed overview of participants' eating habits over the past week, refer to Table 2.

Participants' Mental Health

The survey results of the study participants revealed varied experiences with common mental health issues. For instance, 27.8% felt little interest or pleasure in doing things nearly every day, and 26.4% felt down, depressed, irritable, or hopeless nearly every day. Sleep issues were

Table 1. Sociodemographic Characteristics of Study Participants (N = 478)

	n	**(%)**
Gender		
Male	233	(48.7)
Female	245	(51.3)
Academic Level		
Diploma	43	(9.0)
Bachelor	430	(90.0)
Graduate	5	(1.0)
Student Classification		
First year	62	(13.0)
Second year	138	(28.9)
Third year	110	(23.0)
Fourth year	114	(23.8)
Fifth year or more	54	(11.3)
College		
Other	40	(8.4)
Medical colleges	140	(29.3)
Science and engineering colleges	153	(32.0)
Humanities, education and administration colleges	102	(21.3)
Provincial colleges	43	(9.0)
Currently Living Status		
Alone	46	(9.6)
With family	386	(80.8)
With friends	36	(7.5)
Other	10	(2.1)
	Mean	SD
Age	20.95	2.69
Body Mass Index (BMI)	23.30	6.30

prevalent, with 33.7% experiencing trouble falling or staying asleep, or sleeping too much, nearly every day. Fatigue was also common, with 34.8% feeling tired or having little energy nearly every day. Appetite issues affected 26.2% of participants nearly every day, and 23.4% felt bad about themselves or considered themselves failures. Concentration problems were reported by 20% of participants nearly every day, while 15.1% experienced noticeable changes in movement or restlessness. Overall, according to the Patient Health Questionnaire-8 (PHQ-8), 13.4% of participants had minimal to no symptoms, 27.8% had mild symptoms, 22.4% had moderate symptoms, 19% had moderately severe symptoms, and 17.4% had severe symptoms. For a detailed overview of participants' mental health over the past two week, refer to Table 3.

Relationships between College Students' Mental Health and their Eating Habits

A multiple linear regression analysis was calculated to predict participants' perceived mental health (i.e., Total PHQ8 score) based on their eating habits (i.e., Total Healthy Eating Assessment score) and sociodemographic variables (i.e., Age, gender, academic degree, student classification, college, living arrangement, and BMI). This analysis yielded one regression model. A significant regression equation was found ($F(17, 460) = 5.90$, $p < .001$, $R2 = 0.179$), with participants' gender, living arrangement, and Healthy Eating Assessment score emerging as significant predictors of mental health. First, being female was positively associated with having a higher PHQ8 score compared to being male. Second, living with family or friends was negatively associated with having a higher PHQ8 score compared to living alone. Finally, healthy eating habits was negatively associated with having a higher PHQ8 score. For every one-unit increase of healthy eating habits (i.e., ranging from 10 to 50), there was a 0.48-unit decrease in PHQ8 score. In other words, as participants' healthy eating habits increased, their mental health disorder score decreases. A complete breakdown of the regression results for sociodemographic and eating habit predictors of students' mental health is presented in Table 4.

Sociodemographic and Eating Habit Predictors of Mental Health Disorders

A multivariable logistic regression analysis was used to examine if sociodemographic variables (i.e., Age, gender, academic degree, student classification, college, living arrangement, and BMI) and eating habits (i.e., Total Healthy Eating Assessment score) were predictors of students' mental health disorders (i.e., Total PHQ8 score). According to the Nagelkerke R2 statistic, the model explained 19.1% of the variance in the dependent variable (i.e., mental health disorder vs. no mental health disorder). Patients' gender, student classification, and Healthy Eating Assessment score emerged as the statistically significant predictors in this model. Patients' gender (aOR = 0.478, 95% CI = 0.245, 0.932) (i.e., specifically females) significantly increased their likelihood of having mental health disorders. Furthermore, patients' student classification (i.e., second year students) in increased their likelihood of having mental health disorders when compared to other student classification (aOR = 3.980, 95% CI = 1.188, 13.331). Finally, having a higher Healthy Eating Assessment score significantly decreased patients' likelihood of having mental health disorders (aOR = 0.824, 95% CI = 0.768, 0.885). A complete breakdown of the regression results for the sociodemographic and eating habit predictors of mental health disorders is presented in Table 5.

Table 2. Eating Habit of Study Participants

Question	Answer				
	Poor	**Fair**	**Good**	**Very good**	**Excellent**
How would you rate your overall habits of eating healthy foods?	141 (29%)	125 (26.2%)	119 (24.5%)	63 (13.2%)	30 (6.3%)
	6 or more times	**4-5 times**	**2-3 times**	**1 time**	**Less than 1**
How many times a day did you eat fast/fried food/or packaged snacks high in fat/salt/or sugar?	32 (6.7%)	61 (12.8%)	207 (43.3%)	156 (32.6%)	22 (4.6%)
How many regular soda, sweet tea, juice, energy/sports drinks, sweetened-coffee or other sugar sweetened beverages did you drink each day?	36 (7.5%)	58 (12.1%)	159 (33.3%)	154 (32.2%)	71 (14.9%)
How many times a day did you eat regular (not low-fat) snack chips or crackers?	12 (2.5%)	36 (7.5%)	117 (24.5%)	212 (44.4%)	101 (21.1%)
How many times a day did you eat sweet foods (not the low-fat kind) or desserts, like chocolate or ice cream, and other sweets?	20 (4.2%)	42 (8.8%)	141 (29.5%)	192 (40.2%)	83 (17.4%)
	Less than 1	**1 time**	**2-3 times**	**4-5 times**	**6 or more times**
How many servings (1 serving = 1/2 cup) of fresh, canned, frozen or dried fruit did you eat each day?	196 (41%)	163 (34.1%)	94 (19.7%)	20 (4.2%)	5 (1.0%)
How many servings of fresh, canned, frozen or dried vegetables did you eat each day?	173 (36.2%)	174 (36.4%)	97 (20.3%)	28 (5.9%)	6 (1.3%)
How many times a day did you eat dairy products (milk, unsweetened yogurt, low fat cheese)?	119 (24.9%)	156 (32.6%)	140 (29.3%)	49 (10.3%)	14 (2.9%)
	Heaping amount	**A lot**	**Some**	**Very little**	**None**
How much margarine, butter, lard or muktuk/meat fat did you add to vegetables, potatoes, bread, corn or dried meat?	7 (1.5%)	25 (5.2%)	220 (46.0%)	166 (34.7%)	60 (12.6%)
	Less than 1	**6 or more times**	**4-5 times**	**1 time**	**2-3 times**
How many times a day did you eat meat/fish/beans?	61 (12.8%)	28 (6.1%)	58 (12.1%)	174 (36.4%)	156 (32.6%)
	Needs Improvement	**Fair**	**Good**	**Excellent**	
Healthy Eating Assessment	12 (2.5%)	206 (43.1%)	251 (52.5%)	9 (1.9%)	

Table 3. Mental Health of Study Participants

Question	Answer				
	Not at all	**Several days**	**More than half the days**	**Nearly every day**	
Little interest or pleasure in doing things	63 (13.2%)	183 (38.1%)	100 (20.9%)	133 (27.8%)	
Feeling down, depressed, irritable or hopeless	61 (12.8%)	196 (41.0%)	95 (19.9%)	126 (26.4%)	
Trouble falling or staying asleep, or sleeping too much	75 (15.7%)	145 (30.3%)	97 (20.3%)	161 (33.7%)	
Feeling tired or having little energy	45 (9.4%)	166 (34.8%)	100 (21.0%)	166 (34.8%)	
Poor appetite or overeating	77 (16.1%)	165 (34.5%)	111 (23.3%)	125 (26.2%)	
Feeling bad about yourself – or that you are a failure or have let yourself or your family down	158 (33.1%)	145 (30.3%)	62 (13.0%)	112 (23.4%)	
Trouble concentrating on things, such as school work, reading or watching television	125 (26.3%)	150 (31.5%)	82 (17.2%)	119 (20.0%)	
Moving or speaking so slowly that other people could have noticed? Or the opposite – being so fidgety or restless that you have been moving around a lot more than usual	222 (46.6%)	117 (24.6%)	65 (13.7%)	72 (15.1%)	
	None-minimal	**Mild**	**Moderate**	**Moderately Severe**	**Severe**
Patient Health Questionnaire – 8 (PHQ-8) classification	64 (13.4%)	133 (27.8%)	107 (22.4%)	91 (19.0%)	83 (17.4%)

Table 4. Demographic and Eating habit Predictors of Participants' Mental Health

	Model (Total PHQ8 Score)		
Variable	**B**	**SE**	**P-value**
Healthy Eating Assessment	-0.48063	0.05772	< .001***
Age	0.03099	0.15171	0.83
Gender			
Female	Ref.	Ref.	Ref.
Male	-2.58903	0.63573	< .001***
Academic degree			
Diploma	Ref.	Ref.	Ref.
Bachelors	-0.52852	1.1864	0.66
Graduate	-2.68869	3.50916	0.44
Student Classification			
Fifth year and more	Ref.	Ref.	Ref.
Fourth year	-0.63566	1.10928	0.57
Third year	0.41283	1.16137	0.72
Second year	0.13650	1.26594	0.91
First year	0.20435	1.41257	0.89
College			
Other	Ref.	Ref.	Ref.
Medical colleges	0.18195	1.12401	0.87
Science and engineering colleges	0.69605	1.10612	0.53
Humanities, education and administration colleges	0.35661	1.15355	0.76
Provincial colleges	-0.76552	1.39721	0.58
Living arrangement			
Other	Ref.	Ref.	Ref.
With family	-4.48015	1.98225	0.02*
With friends	-5.30093	2.22592	0.02*
Alone	-5.00136	2.15770	0.02*
BMI	0.02564	0.04578	0.58
Intercept	30.981	4.919	< .001***
R^2	0.179		
Adjusted R^2	0.149		
F	5.902		

Note. *p < .05. **p < .01. ***p < .001; B= adjusted multiple linear regression coefficients; SE= standard error; PHQ8= Patient Health Questionnaire –8; BMI= Body Mass Index

DISCUSSION

The current study investigated the relationship between college students' mental health and their eating habits, along with sociodemographic variables, through multiple linear regression and logistic regression analyses. The results revealed significant predictors of mental health, emphasizing the influence of gender, living arrangement, and healthy eating habits on students' mental well-being.

Gender and Mental Health

Our findings indicate that gender plays a significant role in mental health outcomes among college students. Specifically, being female was positively associated with higher PHQ8 scores, indicating worse perceived mental health compared to males. This aligns with previous research suggesting that female students are more likely to experience higher levels of stress and mental health issues than their male counterparts[26]. The underlying factors may include gender-specific stressors, social roles, and expectations that contribute to the heightened vulnerability of female students to mental health disorders[27].

Living Arrangement and Mental Health

The study found that living arrangement significantly impacts mental health. Students living with family or friends reported better mental health compared to those living alone. This supports existing literature which suggests that social support and a sense of community are crucial for mental well-being[28]. The protective effect of living with others may be attributed to increased emotional and practical support, which mitigates feelings of loneliness and isolation that are common among students living alone[29].

Healthy Eating Habits and Mental Health

Healthy eating habits emerged as a strong negative predictor of mental health disorders, with an increase in healthy eating habits associated with a decrease in PHQ8 scores. This finding corroborates previous studies that have highlighted the positive impact of a balanced diet on mental health[30]. Nutrient-rich diets, including adequate intake of fruits, vegetables, and omega-3 fatty acids, have been linked to lower levels of depression and anxiety among college students[19]. This underscores

Table 5. Sociodemographic and Eating Habit Predictors of Mental Health Disorder

	MHD Vs. No MHD 95% CI for odds ratio (OR)		
Variable	**aOR**	**Lower**	**Upper**
Healthy Eating Assessment	0.824***	0.768	0.885
Age	1.004	0.880	1.147
Gender			
Female	Ref.	Ref.	Ref.
Male	0.478*	0.245	0.932
Academic Degree			
Diploma	Ref.	Ref.	Ref.
Bachelors	0.950	0.261	3.454
Graduate	0.118	0.007	2.018
Student Classification			
Fifth year and more	Ref.	Ref.	Ref.
Fourth year	1.568	0.587	4.194
Third year	2.061	0.722	5.885
Second year	3.980*	1.188	13.331
First year	1.698	0.478	6.030
College			
Other	Ref.	Ref.	Ref.
Medical colleges	1.577	0.514	4.842
Science and engineering colleges	1.721	0.569	5.206
Humanities, education and administration colleges	1.751	0.531	5.774
Provincial colleges	0.518	0.137	1.956
Living arrangement			
Other	Ref.	Ref.	Ref.
With family	0.619	0.109	3.505
With friends	0.362	0.050	2.607
Alone	0.671	0.099	4.553
BMI	1.002	0.951	1.056

Note. *p < .05. **p < .01. ***p < .001; aOR = adjusted odds ratio; CI = confidence intervals; MHD= Mental Health Disorder; BMI= Body Mass Index

the importance of promoting healthy eating behaviors as a potential intervention strategy to improve mental health outcomes in this population.

Sociodemographic Variables and Mental Health

While variables such as age, academic degree, student classification, college type, and BMI were included in the analyses, they did not emerge as significant predictors in the regression models. This suggests that these factors might have a more complex relationship with mental health that could be influenced by other mediating variables not captured in this study. However, the finding that second-year students had a higher likelihood of mental health disorders compared to other classifications is noteworthy. It may reflect the transitional challenges and increased academic pressures faced during this critical period of their education[31].

Implications for Practice and Policy

The results of this study have several implications for practice and policy. Universities and colleges should consider developing targeted mental health interventions that address the specific needs of female students and those living alone. Additionally, promoting healthy eating habits through campus-wide initiatives and nutrition education programs could serve as a preventative measure against mental health disorders. Furthermore, enhancing social support networks and providing resources for students in their second year may help alleviate the mental health challenges associated with this transitional phase.

Limitations and Future Research

This study has several limitations. The cross-sectional design limits the ability to infer causality. Longitudinal studies are needed to better understand the temporal relationships between eating habits and mental health. Additionally, the reliance on self-reported measures may introduce bias. Future research should aim to incorporate objective measures of dietary intake and mental health assessments. Moreover, exploring the role of other potential mediators and moderators, such as physical activity and sleep patterns, could provide a more comprehensive understanding of the factors influencing college students' mental health.

CONCLUSION

In conclusion, this study highlights the significant relationships between gender, living arrangements, healthy eating habits, and mental health among college students. These findings underscore the importance of targeted interventions and supportive environments in promoting mental well-being in this population. By addressing the specific needs identified in this study, institutions can better support the mental health of their students, ultimately enhancing their academic success and overall quality of life.

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