

## Original Article



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# Understanding the Dutch Eating Behavior Questionnaire: Insights from Medical Students

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## Article Info

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## Abstract

**Objective:** Eating behavior play a crucial role in overall health and are particularly relevant for medical students who often face academic pressure and irregular lifestyle. This study investigates how restrained, emotional, and external eating behaviors vary with demographic factors among students at Gujranwala Medical College, Pakistan.

**Methodology:** A descriptive cross-sectional study was carried out between September and November 2024 using the Dutch Eating Behavior Questionnaire (DEBQ). Data were collected from 228 students and analyzed using SPSS version 26. The DEBQ demonstrated good internal consistency (Cronbach's alpha = 0.79). Regression models were used to assess associations between eating behaviors and variables such as academic year, gender, and residential status.

**Results:** Of the total participants, 64% were female, and 70% lived in hostels. Restrained eating was significantly associated with academic year ( $p = 0.014$ ), suggesting higher prevalence among senior students. Emotional and external eating did not show statistically significant links to demographic factors. Exploratory factor analysis revealed different eating behavior trends across subgroups, with females and hostelites reporting greater emotional and external eating tendencies.

**Conclusion:** Restrained eating was influenced by academic year, while emotional and external eating behaviors appeared more common among females and hostel-based students. These insights highlight the importance of targeted wellness strategies that address mental health and dietary habits in medical school settings. Future studies should broaden the sample scope to better understand the interplay between stress, lifestyle, and eating patterns.

**Keywords:** Academic Stress, Eating Patterns, Emotional Eating, External Cues, Medical Students, Restrained Eating, Pakistan.

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## Introduction

Healthy dietary habits are essential not only for individual well-being but also for sustaining effective clinical performance and long-term professional resilience among medical students. While burnout and psychological distress are increasingly acknowledged as widespread among dental students, the systematic incorporation of self-care and wellness education in healthcare curricula remains insufficient. Despite being equipped with knowledge of nutrition and health, medical students frequently demonstrate unhealthy dietary behaviors, reflecting a disconnect between theoretical understanding and personal lifestyle choices.<sup>1</sup>

On a global scale, numerous studies have documented concerning trends in lifestyle choices among this population. A cross-sectional study conducted in 2020 found that 3.2% of medical sciences students were classified as obese, and 25.3% as overweight, with emotional and external eating behaviors significantly linked to higher BMI.<sup>2</sup> In Pakistan, research involving 12 public-sector medical colleges across Punjab indicated that 12.8% of students were overweight, and 2.3% were obese. Female students were disproportionately affected, and non-compliance with structured eating routines emerged as a notable contributing factor. However, variables such as academic year, sleep patterns, and meal frequency were not associated with increased weight, suggesting the influence of deeper psychological and behavioral mechanisms.<sup>3</sup>

Cultural context and environmental conditions also shape eating behaviors in ways that differ from Western norms. While international literature has frequently examined the relationship between stress, diet, and weight fluctuations, qualitative evidence from Germany revealed that dental students face significant psychological stress due to disorganized academic scheduling, high practical workload, limited access to digital tools, and communication gaps with instructors.<sup>4</sup> Similarly, a large-scale cross-sectional study in China involving over 1,600 students showed that both acute and chronic academic stress were associated with poor eating habits, with anxiety acting as a major mediating factor—accounting for over 60% of the short-term stress impact on eating patterns.<sup>5</sup> Longitudinal data from the United Kingdom provided further insight, tracking over 400 students and revealing that many entered university with unhealthy behavior profiles—marked by low physical activity and high psychological stress—which either persisted or worsened over time. The study identified women, gender-diverse students, and second-year students as particularly vulnerable.<sup>6</sup>

A systematic review across six Southeast Asian countries reported median prevalence rates of 29.4% for depression, 42.4% for anxiety, 16.4% for stress, and 13.9% for disordered eating among students, with 7–8% reporting current suicidal ideation—an alarming

trend.<sup>7</sup> Despite global concern over academic stress and its effects on health, limited localized research has holistically explored the intersection of eating behaviors, stress, and lifestyle in the Pakistani context. One such study at Muhammad Medical College, Mirpurkhas, found that many undergraduate students experienced mild to moderate levels of stress, predominantly driven by academic burden, family expectations, hostel life challenges, inadequate food quality, and sleep-related issues—with stress levels notably higher in clinical-year students.<sup>8,9</sup>

Given the potential long-term health consequences, there is a critical need for culturally sensitive, evidence-based interventions. This study, therefore, aims to examine eating patterns, perceived stress, and lifestyle habits among Pakistani medical students, with the intent of guiding targeted health promotion efforts and fostering a more wellness-oriented academic culture.

## Methodology

### Study Design:

A descriptive, cross-sectional study was conducted at Gujranwala Medical College in November 2024. The sample size was estimated using Cochran's formula,<sup>10</sup> assuming a 50% response distribution, 95% confidence level, and a 5% margin of error, resulting in a required sample of 278 students. Following data cleaning and screening, 228 fully completed responses were included in the final analysis. A non-probability convenience sampling approach was employed for participant recruitment.

### Study Population and Sampling

The target population included all enrolled undergraduate students from first to final year at Gujranwala Medical College during the study period. Inclusion criteria required voluntary informed consent and full completion of the Dutch Eating Behavior Questionnaire (DEBQ). Students were excluded if they opted out, failed to submit informed consent, returned incomplete responses, or were not actively enrolled due to academic leave. Ethical clearance was secured from the Institutional Review Board on 25/09/2024 (IRB No: 75/GMC). Participants were informed that their responses would remain anonymous and confidential and would not influence their academic evaluation.

### Data Collection

An introductory information sheet outlining the study's aims and procedures was shared with students via WhatsApp. The primary tool used was the Dutch Eating Behavior Questionnaire (DEBQ), which consists of 33 items categorized into three subscales: Emotional Eating, External Eating, and Restrained Eating. Responses were recorded on a 5-point Likert scale (ranging from 1 = "never" to 5 = "very often"). A Google Form link containing the questionnaire was circulated within official

class WhatsApp groups, accompanied by brief instructions to support independent and private responses.

### Data Analysis

Descriptive analyses were performed for each subscale, including computation of mean, median, mode, standard deviation, and frequency distributions. Cronbach's alpha was used to evaluate internal consistency, yielding a value of 0.79, which reflects satisfactory reliability in the sampled population. Data analysis was conducted using SPSS version 26 to identify potential associations between demographic variables and eating behavior patterns.

## Results

### Participant Characteristics:

This study analyzed data from 228 undergraduate medical students enrolled at Gujranwala Medical College. The academic year breakdown was as follows: 43.2% were from the first year ( $n = 98$ ), 33.6% from the second year ( $n = 77$ ), 10.9% from the third year ( $n = 25$ ), 8.7% from the fourth year ( $n = 20$ ), and 3.5% from the fifth year ( $n = 8$ ). The sample consisted of 64% females ( $n = 146$ ) and 36% males ( $n = 82$ ). With regard to residential status, 70% ( $n = 160$ ) were hostel residents, while 30% ( $n = 68$ ) lived off-campus as day scholars (see Figure 1).

### Descriptive Statistics and Internal Consistency

Summary statistics for the Dutch Eating Behavior Questionnaire (DEBQ) subscales—Restrained, Emotional, and External Eating—are detailed in Table 1. The internal reliability of the instrument was confirmed with a Cronbach's alpha of 0.79, indicating satisfactory consistency across the items.

### Regression and ANOVA Findings

A multiple linear regression was used to assess whether academic year, gender, and residential status were significant predictors of overall eating behavior scores. According to the ANOVA results ( $F(3, 224) = 0.935$ ,  $p = 0.424$ ), the model was not statistically significant. These demographic predictors collectively accounted for only 1.2% of the variation in eating behavior ( $R^2 = 0.012$ , adjusted  $R^2 = -0.001$ ), as shown in Table 2.

When examined individually, restrained eating emerged as a significant negative predictor ( $B = -0.022$ ,  $SE = 0.009$ ,  $p = 0.014$ ), suggesting that higher restrained-dis associated with lower total eating behavior scores. In contrast, emotional eating ( $B = -0.004$ ,  $SE = 0.007$ ,  $p = 0.564$ ) and external eating ( $B = 0.011$ ,  $SE = 0.009$ ,  $p = 0.284$ ) did not exhibit significant associations with the outcome variable. The model's constant term was significant ( $B = 2.224$ ,  $p < 0.001$ ) (Table 3).

Figure 2 is a clustered bar chart showing the response distribution (Strongly Disagree to Strongly Agree) for

each category of eating behavior across 33 DEBQ items.

### Exploratory Factor Analysis (EFA)

To explore the underlying structure of eating behaviors, an exploratory factor analysis was conducted separately based on gender and residential status. Among female students and day scholars, a single-factor model emerged, accounting for approximately 42–46% of the total variance, suggesting a unidimensional structure of eating behavior.

Conversely, two distinct factors were extracted for male students and hostel residents, explaining 73% and 74% of the variance, respectively. In these groups, restrained and emotional eating clustered together on one factor, while external eating loaded separately, forming a second distinct dimension (Table 4).

Sampling adequacy was supported by Kaiser-Meyer-Olkin (KMO) values above 0.6, and Bartlett's test of sphericity was statistically significant ( $p < 0.001$ ) for all groups, confirming the suitability of the data for factor analysis and the robustness of the factor structure.

## Discussion

This cross-sectional analysis examined the eating patterns of undergraduate medical students at Gujranwala Medical College, focusing on restrained, emotional, and external eating behaviors in relation to academic year, gender, and residential status. While students generally understand the importance of nutritious diets, maintaining consistent and healthy eating habits appears challenging due to academic and emotional stressors. Alghamdi et al.<sup>10</sup> previously reported that just 57.4% of medical students acknowledged the value of breakfast. Our findings extend this understanding by identifying hostel residency as a contextual influence contributing to breakfast skipping—despite its known importance. Moreover, emotional eating behaviors may be underreported in self-assessment formats, as noted by Alghamdi et al.<sup>10</sup>

A recent study noted that although medical students were aware of healthy food choices, gaps remained in understanding specific nutritional requirements, cooking methods, and accessing professional dietary guidance—likely due to limited curricular emphasis on nutrition.<sup>11</sup> In a U.S. study of 71 preclinical medical students, time-saving and convenience were key dietary determinants. Two-thirds reported a decline in healthy eating after entering medical school. Additionally, 46.5% indicated willingness to purchase healthier campus food options, while 36.6% emphasized cost as a critical factor.<sup>12</sup>

In Algeria, research using the DEBQ showed significantly elevated emotional ( $2.88 \pm 0.99$ ) and external eating scores ( $3.31 \pm 0.68$ ) among individuals with obesity compared to those with normal BMI ( $1.71 \pm 0.32$  and  $1.96 \pm 0.29$ , respectively), though no significant differ-

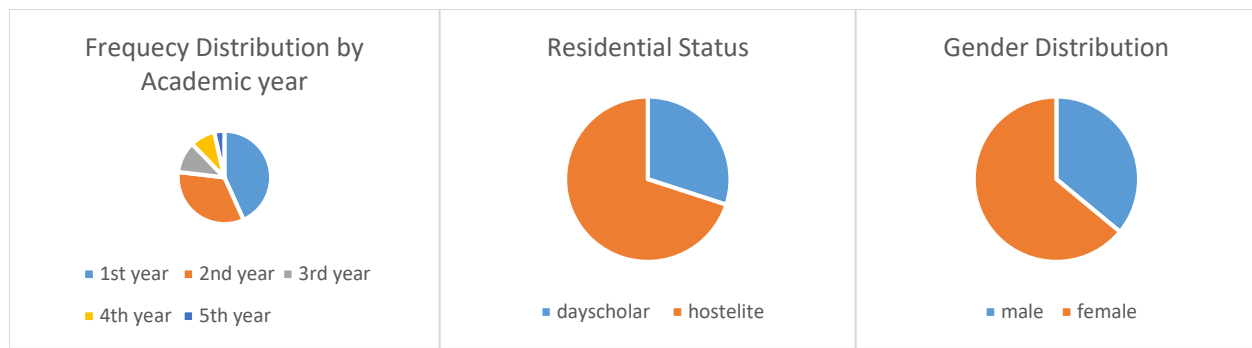


Figure 1: Demographic Distribution of Study Participants

This figure shows the distribution of MBBS students by demographic variables. It was a representation across academic years, with a slightly higher proportion of female students.

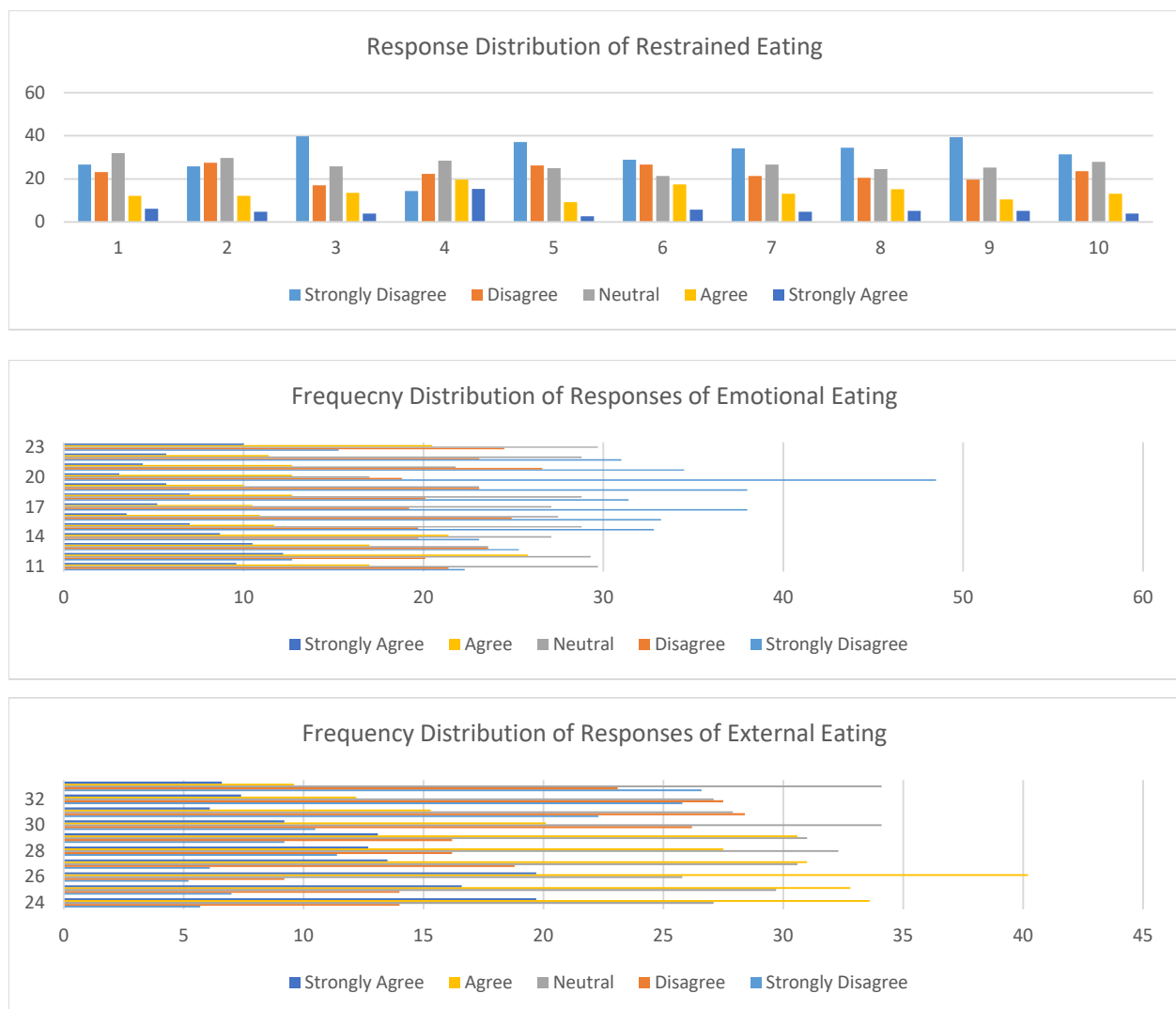


Figure 2: Frequency of Restrained, Emotional, and External Eating Behaviors

A clustered bar chart showing the response distribution (Strongly Disagree to Strongly Agree) for each category of eating behavior across 33 DEBQ items.

Legend: Most respondents reported moderate to high levels of emotional eating. External eating behavior had the highest "agree" responses, especially regarding environmental food cues.

Table 1. Distribution of Responses to DEBQ Items (n =228)

Sr. No	Item #	Strongly Disagree n (%)	Disagree n (%)	Neutral n(%)	Agree n (%)	Strongly Agree n (%)
1	If you have put on weight, do you eat less than you usually do?'	26.6	23.1	31.9	12.2	6.1
2	Do you try to eat less at mealtimes than you would like to eat?	25.8	27.5	29.7	12.2	4.8
3	How often do you refuse food or drink offered because you are concerned about your weight?	39.7	17	25.8	13.5	3.9
4	Do you watch exactly what you eat?	14.4	22.3	28.4	19.7	15.3
5	Do you deliberately eat foods that are slimming?	37.1	26.2	24.9	9.2	2.6
6	Do you deliberately eat foods that are slimming?	28.8	26.6	21.4	17.5	5.7
7	Do you deliberately eat less in order not to become heavier?	34.1	21.4	26.6	13.1	4.8
8	How often do you try not to eat between meals because you are watching your weight?	34.5	20.5	24.5	15.2	5.2
9	How often in the evening do you try not to eat because you are watching your weight?	39.3	19.7	25.3	10.5	5.2
10	Do you take into account your weight with what you eat?	31.4	23.6	27.9	13.1	3.9
11	Do you have the desire to eat when you are irritated?'	22.3	21.4	29.7	17	9.6
12	Do you have a desire to eat when you have nothing to do?'	12.7	20.1	29.3	25.8	12.2
13	Do you have a desire to eat when you are depressed or discouraged?'	25.3	23.6	23.6	17	10.5
14	Do you have a desire to eat when you are feeling lonely?'	23.1	19.7	27.1	21.4	8.7
15	Do you have a desire to eat when somebody lets you down?'	32.8	19.7	28.8	11.7	7
16	Do you have a desire to eat when you are cross?	33.2	24.9	27.5	10.9	3.5
17	Do you have a desire to eat when you are approaching something unpleasant to happen?	38	19.2	27.1	10.5	5.2
18	Do you get the desire to eat when you are anxious, worried or tense?	31.4	20.1	28.8	12.7	7
19	Do you have a desire to eat when things are going against you or when things have gone wrong?	38	23.1	23.1	10	5.7
20	Do you have a desire to eat when you are frightened?'	48.5	18.8	17	12.7	3.1

21	Do you have a desire to eat when you are disappointed?'	34.5	26.6	21.8	12.7	4.4
22	Do you have a desire to eat when you are emotionally upset?*	31	23.1	28.8	11.4	5.7
23	Do you have a desire to eat when you are bored or restless?'	15.3	24.5	29.7	20.5	10
24	If food tastes good to you, do you eat more than usual?	5.7	14	27.1	33.6	19.7
25	If food smells and looks good, do you eat more than usual?	7	14	29.7	32.8	16.6
26	If you see or smell something delicious, do you have a desire to eat it?	5.2	9.2	25.8	40.2	19.7
27	If you have something delicious to eat, do you eat it straight away?	6.1	18.8	30.6	31	13.5
28	If you walk past the baker do you have the desire to buy something delicious?	11.4	16.2	32.3	27.5	12.7
29	If you walk past a snack bar or a cafe, do you have the desire to buy something delicious?	9.2	16.2	31	30.6	13.1
30	3If you see others eating, do you also have the desire to eat?	10.5	26.2	34.1	20.1	9.2
31	Can you resist eating delicious foods?	22.3	28.4	27.9	15.3	6.1
32	Do you eat more than usual, when you see others eating	25.8	27.5	27.1	12.2	7.4
33	When preparing a meal are you inclined see others eating?	26.6	23.1	34.1	9.6	6.6

Table 2. ANOVA: Effect of Demographics on Eating Behaviors

	Sum of squares	df	Mean Square	f	Sig.
Academic Year	9.079	3	3.026	2.6	0.051
Day scholar/ Hostelite	0.387	3	0.129	0.54	0.653
Gender	0.646	3	0.215	0.93	0.424

Academic year had a near-significant impact ( $p = 0.051$ ), while gender and residential status showed no significant effect on eating behaviors.

Table 3. Regression Analysis for Eating Behaviors

Predictor	B	Standard error	B	t	p-value
Constant	2.224	0.4		5.4	0.0001
Restrained	-0.022	0.009	-0.16	-2.4	0.014
Emotional	-0.004	0.006	-0.038	-0.57	0.56
External	-0.011	0.0011	-0.071	-0.28	0.28

Restrained eating showed a significant negative association with the outcome variable ( $p < 0.05$ ).



Table 4. Factor Analysis: DEBQ Measures by Demographic Subgroups

Group	KMO	Bartlett's Test of Sphericity	No. Of Components Extracted	Total variance explained (%)	Main Component Loading	Dominant Behavior
Males	0.48	0.35	2	73%	Emotional (0.779), Restrained (0.475), External (-0.606)	Emotional + Restrained
Females	0.55	0.009	1	100%	Emotional (0.7), Restrained (0.65), External (0.58)	All behaviors
Day scholars	0.52	0.042	1	45%	Emotional (0.79), Restrained (0.6), External (0.58)	Emotional Predominant
Hostelites	0.509	0.035	3	74%	Emotional (0.77), Restrained (0.74), External (-0.2)	Emotional + Restrained

ences were found in restrained eating.<sup>13</sup> This reinforces the clinical relevance of emotional and external eating patterns, which may contribute to weight gain over time despite not being clearly linked to demographics.

Supporting this, a large-scale Chinese study ( $n = 1068$ ) found that body dissatisfaction and inflexible body image perceptions fully mediated the connection between BMI and dietary restraint. Gender differences in regression coefficients revealed varied body image impacts on restrictive eating.<sup>14</sup> Similarly, data from over 6,000 young adults across eight countries demonstrated that emotional and restrained eating were associated with increased BMI, lower self-esteem, and reduced body satisfaction, whereas intuitive eating was linked to improved mental and physical well-being.<sup>15</sup> Despite minor cultural variations, these results point to the global importance of fostering self-acceptance and implementing early interventions to discourage disordered eating.

Among Saudi female students ( $n = 359$ ), 41.2% demonstrated moderate emotional eating tendencies, significantly correlated with higher BMI ( $r = 0.28$ – $0.29$ ), frequent snacking, greater sweet intake, meal skipping, and increased dining out ( $p < 0.05$ ).<sup>16</sup> This supports the view that emotional eating may exert a stronger influence on unhealthy food choices than demographics alone, emphasizing psychological and environmental stressors.

During the COVID-19 lockdown, an Egyptian study of 580 students and faculty members in medical institutions reported that over half showed moderate emotional eating levels, which were positively correlated with perceived stress ( $r = 0.13$ ,  $p = 0.001$ ).<sup>17</sup> Likewise, in Rawalpindi, final-year medical students experiencing high stress reported significantly greater consumption of sweet foods ( $p = 0.000$ ), processed snacks ( $p = 0.001$ ), and fast food ( $p = 0.012$ ), along with reduced fruit and vegetable intake.<sup>18</sup> A separate study from the same region reported a 17.48% coronary artery disease prevalence, with strong positive associations with fast food intake ( $p = 0.0007$ ,  $r = +0.812$ ) and a negative

association with fruit and vegetable consumption ( $p = 0.0006$ ,  $r = -0.831$ ).<sup>19</sup>

Cultural influences on stress-related eating were evident in a cross-national comparison involving 748 Italian and French students. Academic stress increased unhealthy eating among Italians but reduced junk food intake among French participants.<sup>22</sup> Emotional eating and BMI moderated the effect of academic stress on sweet consumption and snacking behavior, whereas restrained eating did not significantly influence this relationship.<sup>20</sup>

A separate investigation of 297 medical students showed that 72% experienced moderate and 26% high academic stress during exam periods.<sup>23</sup> Poor dietary practices were prevalent, with 66% skipping breakfast and 69% frequently consuming unhealthy snacks. Elevated stress levels correlated with both worsened diet quality ( $p = 0.007$ ) and increased gastrointestinal symptoms ( $p < 0.001$ ).<sup>21</sup> Similarly, among 327 university students in Erbil, Iraq, 87% experienced examination-related stress, which significantly affected dietary habits, fatigue, and sleep quality.<sup>22</sup>

A validated survey also reported widespread unhealthy eating among university students, with women more likely than men to exhibit poor dietary habits.<sup>23</sup> Barriers included time constraints, emotional stress, limited nutrition education, and restricted access to nutritious food options.

Reinforcing international findings on the emotional impact of medical training, a scoping review concluded that although medical students frequently experience emotional and moral distress—especially during clinical rotations—formal instruction in self-care remains insufficient across most medical education systems.<sup>24</sup>

This study's cross-sectional design limits the ability to infer causality. Reliance on self-reported data may introduce bias due to underreporting or social desirability. The relatively small size of certain subgroups, particularly fifth-year students, may restrict the generalizability of subgroup findings. Furthermore, while

gender and residence were explored, other influential variables—such as socioeconomic status, physical activity, or mental health conditions—were not included. Future studies should adopt longitudinal designs and incorporate a broader range of psychosocial and cultural determinants to better understand the evolving patterns of eating behavior in this population.

## Conclusion

This study identifies academic year as a significant predictor of restrained eating behavior among medical students, while emotional and external eating appear more closely associated with gender and residential context. Female students and hostel residents displayed greater susceptibility to stress-induced eating patterns. Given the uneven subgroup sizes, the findings must be interpreted with caution. Employing statistical techniques such as weighted analyses or multivariate modeling could help account for group imbalances. In the absence of such methods, careful interpretation is warranted to avoid overstating group differences.

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