

PERCEIVED STRESS AND EATING HABITS AMONG MEDICAL STUDENTS

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ABSTRACT

Background: Stress is thought to influence human eating behavior. The aim of this study was to assess the pattern of eating habits and its association with stress among medical students.

Methods: A cross sectional study was conducted. A self-administered questionnaire was used including questions on socio-demography, anthropometry, and eating habits. Cohen's Perceived Stress Scale was used for stress assessment.

Results: A total of 723 students were enrolled with a mean age of 20.6 ± 1.9 years. Skipping breakfast and infrequent daily meals were the most frequent unhealthy habits reported by the students (60.4% and 56.7% respectively), particularly among female students and were significantly associated with higher levels of stress. Stress scores were significantly high among females and those with low family income. Stress-induced eating was significantly more common among female students than males [33.6% vs. 24.4%; OR, 1.63; 95% CI, 1.16-2.29; $P = 0.001$], and it was significantly associated with obesity and overweight.

Conclusions: Some unhealthy eating habits particularly skipping breakfast and infrequent daily meals were common among medical students and were associated with stress.

KEYWORDS: Eating Habits, Stress, Students

INTRODUCTION

Appetite and consequently the types and amount of food consumed by humans are affected by many internal and external factors. Internal factors include physiological mechanisms that regulate appetite, with hormones stimulating food intake i.e. increasing appetite such as neuropeptide Y^{1,2} and others reducing food intake such as leptin³. External factors that may affect food intake are; economic such as food availability, social including influence of others⁴ and palatability of food⁵. It is commonly believed that stress may alter eating behavior⁶ that results either in suppression of food intake⁷ or consuming energy dense foods^{8,9}.

Stress can be defined as “the generalized, non-specific response of the body to any factor that overwhelms, or threatens to overwhelm, the body's compensatory abilities to maintain homeostasis”¹⁰.

Stress arises when the situation's demands exceed the coping abilities of the individuals, resulting in cognitive, behavioral and emotional disturbances¹¹.

University students faces many stresses such as pressure to succeed, competition with peers, academic overload, adjusting to new living situation, meeting new people and sometimes financial burden¹².

Many unhealthy behaviors had been identified to be associated with increased stress such as infrequent exercise, alcohol drinking, smoking, sleep disorders and eating poorly¹³.

It was reported that stress is associated with both an imbalanced dietary pattern and emotional eating^{9,14,15}. However, several studies showed conflicting results. Some studies showed that stress was associated with increased carbohydrates and fat resulting in obesity development, while others found stress is associated with poorer food choices such as decreased fruits and vegetables consumption^{12,16,17}.

Data on stress and dietary habits and food consumption pattern among students in Basrah are limited. This study was conducted to assess the pattern of eating habits and its association with stress among medical students in Basrah, Iraq.

SUBJECTS AND METHODS

Study Setting and Population

This cross sectional study was conducted among students of College of Medicine, Basrah University, Iraq during the academic year 2013-2014 for the period from 15th February to 10th April 2014. After arrangement with lecturers, students from the first to fifth years were approached in the classroom after lectures. All the students who were present in the classroom at the time of collecting data were asked to participate in this study voluntarily. Objectives of the study were explained to respondents orally. They were assured that information obtained would be anonymous and confidential. An informed consent was obtained from those who agreed to participate. Approval of the study was obtained from the Ethics Committee of College of Medicine.

Data Collection

For data collection, a self-administered questionnaire adopted from previous published studies was used^{18,19}. The first part included questions on demographic data; such as age, sex, father and mother education level, and family monthly income. Weight, height and Body mass index (BMI) and smoking were also included in this part. The second part includes questions on eating habits for the past month such as eating at breakfast daily, frequency of daily meals, vegetables and fruits consumption, consumption of fast food, and snacking.

Stress was measured using the Cohen Perceived Stress Scale (PSS), a validated 10- item questionnaire²⁰ that measures to what extent respondents consider their life situations to be stressful, unpredictable, uncontrollable and overwhelming.

The questions ask individuals about their stress levels in the past month prior to being surveyed and are formatted in a 4-point rating scale from 0 (never) to 4 (very often) to each item, and scores of items 4, 5, 7 and 8 were reversed. Scores for individual participants were obtained by summing their responses to all 10 items. A sum stress score is then generated, ranging in value from 0 to 40. The PSS is not a diagnostic instrument, so there were no cut-offs to determine stressed individuals. Higher scores corresponded to higher perceived stress.²¹ Stress-related eating was assessed using the item "When you encounter stress in life, e.g. a difficult matter, occasion or situation, do you try to make yourself feel better by eating?. The answer was dichotomized into "Yes" and "No". Those who answered "Yes" were classified as stress-induced eaters. Those who answered "No" were classified as non stress-induced eaters²².

STATISTICAL ANALYSIS

Data were analyzed using SPSS software, version 19.0. The Chi squared test was used to study the relationship between categorical variables and t- test or ANOVA were used to compare means. The level of significance was set at $p < 0.05$.

RESULTS

A total of 782 students who were present at classrooms during the study were targeted, the completed questionnaires were 723 (92.4%) which represents the study population. The mean age of the students was 20.6 ± 1.9 years (Range 17-35 years). Females constituted 62.7% of the study population. Only 4.8% of them reported current smoking and 19.8% were either overweight or obese with a body mass index (BMI) mean of 22.8 ± 7.5 Kg/m².

The mean total stress score for all students was 22.1 ± 6.3 . The mean stress score for those who were aged >20 years was 22.2 ± 6.6 compared with 20.0 ± 6.0 for students aged ≤ 20 years without significant difference. Female students scored significantly higher stress than males (23.3 ± 6.1 vs. 20.2 ± 6.4) with highly significant difference ($P < 0.001$). Similarly, students with low family monthly income ($< 1,000,000$ Iraqi Dinar) also showed significantly ($P = 0.029$) higher mean stress score (22.8 ± 6.0) compared with those with family monthly income of $\geq 1,000,000$ Iraqi Dinar (21.7 ± 6.5). No significant association was found between stress score and other socio-demographic characteristics. [Table 1]

Table 1: Baseline Characteristics and Perceived Stress Score (Mean)

Character	N (%)	PSS Score (Mean \pm SD)	P-Value
Age (years) ≤ 20 > 20	356 (49.2) 367 (50.8)	20.0 ± 6.0 22.2 ± 6.6	0.662
Sex Male Female	270 (37.3) 453 (62.7)	20.2 ± 6.4 23.3 ± 6.1	< 0.001
Father education < 12 years ≥ 12 years	76 (10.5) 566 (89.5)	23.3 ± 5.4 21.9 ± 6.5	0.101
Mother education < 12 years ≥ 12 years	150 (20.7) 473 (79.3)	22.5 ± 5.6 22.0 ± 6.5	0.434
Family monthly Income $< 1,000,000$ $\geq 1,000,000$	267 (36.9) 456 (63.1)	22.8 ± 6.0 21.7 ± 6.5	0.029
Smoking Current smoker Non-smoker	35 (4.8) 688 (95.2)	21.8 ± 7.5 22.1 ± 6.3	0.761
BMI (Kg/m ²) < 25 (Normal & underweight) 25 - 29.9 (Overweight) ≥ 30 (Obese)	580 (80.2) 116 (16.1) 27 (3.7)	22.2 ± 6.4 21.6 ± 6.3 21.7 ± 6.1	0.558

The majority of students (60.4%) reported skipping breakfast, and 56.7% taking daily meals (< 3 times). Female students showed unhealthier eating habits compared to males in term of skipping daily breakfast intake (62.7% vs. 56.7%) and less daily meal frequency (61.8% vs. 48.1%). There was a significant gender difference in the daily frequency of meal intake ($P < 0.001$).

Female students tend significantly ($P < 0.001$) to consume less fast meals, and to consume more fruits and vegetables than males. No sex difference was noted regarding snacking between meals (12.2% of males vs. 12.4% of females). [Table 2]

Table 2: Eating Habits among the Participants

Dietary Habits	Sex		Total N (%)	X ² ; P-Value
	Male N (%)	Female N (%)		
Daily breakfast				
Yes	117 (43.3)	169 (37.3)	286 (39.6)	2.570; 0.109
No	153 (56.7)	284 (62.7)	437 (60.4)	
Frequency of daily meals				
Less than three times	130 (48.1)	280 (61.8)	410 (56.7)	12.682; < 0.001
Three or more times	140 (51.9)	173 (38.2)	313 (43.3)	
Snacking between meals				
< 3 times/ day	237 (87.8)	397 (87.6)	634 (87.7)	0.003; 0.956
≥ 3 times/ day	33 (12.2)	56 (12.4)	89 (12.3)	
Consumption of fast meals				
< 4 times/ week	186 (68.9)	371 (81.9)	557 (77.0)	16.187; < 0.001
≥ 4 times/ week	84 (31.1)	82 (18.1)	166 (23.0)	
Weekly consumption of vegetables				
Less than three times	146 (54.1)	208 (45.9)	354 (49.0)	4.505; 0.034
Three or more times	124 (45.9)	245 (54.1)	369 (51.0)	
Weekly consumption of fruits				
Less than three times	114 (42.2)	186 (41.1)	300 (41.5)	0.094; 0.759
Three or more times	156 (57.8)	267 (58.9)	423 (58.5)	
Total	270 (37.3)	453 (62.7)	723 (100)	

Skipping breakfast was associated with high stress score compared with having breakfast daily (22.7 ± 6.5 vs. 21.3 ± 6.0 , $P = 0.003$), and infrequent daily meals (<3times/day) was also significantly associated with high mean stress scores compared with daily meals intake of ≥ 3 times (22.8 ± 6.3 vs. 21.3 ± 6.3 , $P = 0.002$). Students who consumed fruits less frequently (<3 times/week) scored higher level of stress compared with those who ate fruits ≥ 3 times/week) with a highly significant difference (22.9 ± 6.2 vs. 21.5 ± 6.4 , $P = 0.004$). No significant association was found between other dietary habits and stress. [Table 3]

Table 3: Dietary Habits and Stress Scores

Dietary Habits	Stress Scores (Mean \pm SD)	P-Value
Daily breakfast		
Yes	21.3 \pm 6.0	0.003
No	22.7 \pm 6.5	
Frequency of daily meals		
Less than three times	22.8 \pm 6.3	0.002
Three or more times	21.3 \pm 6.3	
Snacking between meals		
< 3 times/ day	21.2 \pm 6.1	0.151
≥ 3 times/ day	22.3 \pm 6.4	
Consumption of fast meals		
< 4 times/ week	22.6 \pm 6.3	0.058
≥ 4 times/ week	21.7 \pm 6.4	
Weekly consumption of vegetables		
< 3 times	22.5 \pm 6.1	0.426
≥ 3 times	22.0 \pm 6.4	
Weekly consumption of fruits		
< 3 times	22.9 \pm 6.2	0.004
≥ 3 times	21.5 \pm 6.4	

The mean BMI of stress-induced eaters was significantly higher than that of non stress-induced eaters (24.2 ± 12.2 vs. 22.2 ± 3.9 , $P=0.001$). Compared with non stress-induced eaters, stress-induced eaters had significantly a higher prevalence of overweight and obesity ($P=0.007$). [Table 4]

Table 4: Association of BM1 with Stress-Induced Eating

Variable	Stress-Induced Eating (n=218)	Non stress Induced Eating (n=505)	P-Value
BM1(Kg/m ²), Mean \pm SD	24.2 ± 12.2	22.2 ± 3.9	0.001
Normal &underweight, n (%)	158 (72.5)	422 (83.6)	0.007
Overweight, n (%)	48 (22.0)	68 (13.5)	
Obese, n (%)	12 (5.5)	15 (2.9)	

Stress- induced eating was significantly more common among female students 152/453 (33.6%) than males 66/270 (24.4%) [OR, 1.63; 95% CI, 1.16 -2.29; $P=0.001$]. In contrast to females, no significant difference was found in the mean of BMI and the prevalence of overweight and obesity among male students with stress-induced and non stress-induced eating. Female students who were stress-induced eaters showed significantly higher mean BMI and a high prevalence of overweight and obesity compared with non stress-induced eaters. [Table 5]

Table 5: Association between Stress-Induced Eating Behavior and Obesity Measures (Body Mass Index, Overweight and Obesity) According to Sex

Variable	Male		P-Value	Female		P-Value
	Stress-Induced (N=66)	Non-Stress Induced (N=204)		Stress-Induced (N=152)	Non-Stress Induced (N=301)	
BM1(Kg/m ²), Mean \pm SD	24.1 ± 3.9	23.1 ± 4.8	0.145	24.2 ± 14.3	21.5 ± 3.0	0.002
Normal &underweight, n (%)	41 (62.1)	154 (75.5)	0.069	117 (77.0)	268 (89.0)	0.002
Overweight	21 (31.8)	40 (19.6)		27 (17.8)	28 (9.3)	
Obese	4 (6.1)	10 (4.9)		8 (5.3)	5 (1.7)	

DISCUSSIONS

The results of this study showed that medical students suffer from considerable stress (The mean score of stress was 22.1 ± 6.3 ; 95% CI 21.7 ± 6.1 - 22.6 ± 6.7), a result which had been reported by others^{23,24}. Medical students have hard schedule and they also required to deal with a large amount of knowledge²³.

Female students scored higher stress than males (23.3 ± 6.1 Vs 20.2 ± 6.4 , $P < 0.001$). This results agrees with that of other studies^{21,24}. This probably reflects gender difference in rating of stress experience and reaction to stressors due to socialization and gender norms which consider emotional expression among males is an admission of weakness rather than inequality in number of stressors²⁵⁻²⁷. However, others showed no relation between gender and stress²⁸.

This study revealed that higher stress score was significantly associated with lower family income ($P=0.029$). Also, students whose parents were with low educational level scored higher level of stress but without significant difference. It was reported that lower educational level of parents or a lower family affluence could be considered as predisposing to stressful life events²⁹.

It had been shown that cigarette smoking not only relieves stress, but it may indicate a non-verbal expression of stress³⁰. Most students smoke not only because of stress, but may be for other reasons such as avoiding being alone, to

facilitate social interactions, or to behave as a member of a group³¹. In this study, smokers showed lower level of stress but without significant association.

In accordance with other studies^{32,33}, this study found that meal skipping behavior was prevalent among medical students in Basrah. The most frequently skipped meal was breakfast (60.4%), and more than half of them (56.7%) reported infrequent daily meal meals. Additionally, female students were found to be more likely to ate irregular meals (<3 times/day) and to skip breakfast than males. The possible reasons for this phenomenon may be the influence of body image and trying to avoid overweight³⁴.

The frequent consumption of snacks and fast meals is a recognizable pattern of adolescents' eating behavior³⁵. Surprisingly, this study found that only 12.3% of the students had snacking of three times or more per day and 23% of them reported weekly consumption of fast food at 4 times or more, a result which is similar to that reported by Ganasegeran et al¹⁹, but it is lower than that reported among Lebanese students³⁶. Slightly more than half of the students in this study consumed fruits and vegetables frequently (58.5% and 51% respectively). This finding was higher than that reported in Bahrain³⁵. However, Ganasegeran et al reported that 81.8% of Malaysian medical students consumed vegetables frequently but 48.5% of them consumed fruits three times or more/week¹⁹.

The relationship between perceived stress and eating habits may be modified by several factors, including; sex, obesity, and eating behavior (such as emotional or restrained eating)³⁷.

Many studies showed that people (particularly women and restrained eaters) responded to high levels of stress by consuming foods high in calories, fewer main meals, and fewer portions of vegetables^{9,38}. Similarly, this study showed that students with high level of stress showed significantly unhealthy eating habits such as skipping breakfast, infrequently daily meals, and infrequent fruits consumption. Other eating habits such snacking between meals, eating fast meals, infrequent vegetable consumption were also common among stressed students but without significant association.

In this study, the percentage of underweight was 9.5%. This is partly because females constituted the majority of the study population, and it was reported that females are more cautious about their weight than males³⁶. Overweight and obese students represented 16.1% and 3.7% respectively. This finding is consistent with a study done in Kolkata, in which prevalence of overweight was 17.5% and obesity was 3.4%, but it was lower than that in Saudi Arabia where the prevalence of overweight was 21.8% and 15.7% were obese^{39,40}.

Stress and body weight relationships are difficult to measure due to the potential for stress to induce weight gain and weight loss in different individuals^{41,42}. The trend towards increased body mass index (BMI) in the higher stress groups may be the more than the weight-loss pattern. However, stress could be the result of a higher body weight, not the cause⁴³.

In this study, the body mass index was highest among stress-induced eaters particularly among women, a result which is similar to that of others^{22,44}. Females due to greater body image concerns, are more often restrained eaters⁴⁵ and restrained eaters tend to eat less during normal conditions and overeat when stressed^{9,46}. A gender difference in response to stress was reported; females are more likely to use food to deal with stress whereas males tend to use alcohol consumption or smoking to cope with stress^{47,48}.

A few limitations must be addressed in this study. This study was a cross sectional based on self-reporting information therefore, reporting bias may have occurred particularly that related to weight and height. However, the

self-reported measure of height and weight had been validated by many studies^{49,50}. Furthermore, as a cross-sectional study, no causal effects can be established.

Despite these limitations, the results are valuable in providing insights about perceived stress and eating habits among medical students in Basrah.

CONCLUSIONS

In conclusion, the study revealed that medical students in Basrah experienced a high level of stress particularly female students. Skipping breakfast and infrequent daily meals were some of the unhealthy eating habits reported by the students and were associated with higher levels of stress. Stress-related eating was significantly associated with overweight and obesity.

Educating students about skills to cope with stress, and addressing the relationship between lower stress levels and healthy eating habits could lead to improvement of their lives.

ACKNOWLEDGEMENTS

The author would like to thank the study subjects who took the time and participated in this study.

Declaration of Interest

The author declares that there are no competing interests, and also that there were no sources of funding for this study.

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