

# FOOD ADDICTION AND ITS RELATIONSHIP WITH STRESS AND OBESITY IN FEMALE UNIVERSITY STUDENTS OF ISLAMABAD RAWALPINDI PAKISTAN

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### Abstract

**Background and Objectives:** Non-communicable diseases (NCDs) and obesity are global health concerns linked to overeating, food addiction and stress. The aim of this study was to investigate the prevalence of food addiction and its relationship with stress and obesity in female university students in Islamabad/Rawalpindi. **Methodology:** A total of 384 female university students were enrolled in the study. Data regarding anthropometric measurements, food addiction and perceived stress were collected. Data was analyzed with the help of SPSS version 26. **Results:** The study observed that among female university students, most had a normal body weight (62.0%), followed by underweight (19.0%) and overweight (14.0%) categories. The majority exhibited low food addictions (81.0%), while a small percentage reported high food addiction. A few subjects reported high stress levels. The study identified a significant association between food addiction, obesity, and perceived stress ( $p < 0.001$ ). **Conclusion:** The observed results could potentially be attributed to the selection of students who reported stress and had heavy study loads. These factors may contribute to the interplay between food addiction, stress, and body weight in this population. Further research and targeted interventions are warranted to promote healthier behaviors and address the implications of these findings.

**Keywords:** Food Addiction, Perceived Stress, Obesity, Female University Students

## 1. INTRODUCTION

Non-communicable diseases (NCDs) such as cardiovascular disease, cancer, diabetes, and chronic respiratory diseases are strongly associated with overweight and obesity. These diseases account for approximately 68% of global deaths. Obesity rates, especially among women, are increasing globally, and it is predicted that severe obesity will continue to rise by 2025. Studies have established links between obesity and the risk

of major NCDs, but specific percentage data require further clarification. (Zatońska et al., 2021). The World Health Organization reports that over 26% of women in Pakistan are obese, while only 19% of men are obese (WHO, 2017; Siddiqui et al., 2018). Food addiction (FA) is an area of research interest, with a definition that relates it to problematic eating behaviors. It suggests that certain foods may possess addictive properties, triggering increased intake and activating brain reward circuits (Bunio et al., 2021). FA classification as a distinct illness from eating disorders is still debatable. However, eating disorder patients and individuals who are overweight or obese have a lot greater food addiction than nonclinical patients (Granero et al., 2018). According to studies, university students (24%) are more prone than the general population (20%) to becoming addicted to food. Students in college are a known population at risk for eating problems (Praxedes et al., 2022). Being overweight or obese is linked to disorders like type 2 diabetes, dyslipidemia, reproductive issues, hypertension, and certain types of cancer (Chu et al., 2018). Weight gain can be influenced by genetic and non-genetic factors, with dietary choices impacting epigenetic pathways and genetic susceptibility to obesity. High-fat food and sugary drink consumption may increase the genetic predisposition to obesity. (Lei and Morris, 2018).

Stress is a complex process through which individuals perceive and cope with problems and hazards in their environment, extending beyond mere reactions to external stimuli (Huang et al., 2020). Stress among students is recognized as a significant concern, with adverse effects on mental and physical health if not effectively managed (Guruprakash et al., 2018). A study focusing on the impact of medical education on students' mental health revealed that stress (11.9-19.9%), depression (12-30%), and anxiety (41.1-56.7%) were the primary health issues. Female medical students compared to their male counterparts, are more susceptible to experiencing abuse, sexual harassment, exhaustion, anxiety, depression, and stress related to academic demands and medical competence, with greater concerns about grades (Alalwani et al., 2018). Further research suggests that female students may experience more stress due to increased motivation to meet academic goals. There is a link between elevated stress levels and suboptimal academic achievement among female medical students. (Verdonk et al., 2014). In 2009, the Yale Food Addiction Scale (YFAS) became the first screening instrument for FA. FA is based on the definition of addictive disorders in both diagnosis manuals. (Hebebrand & Gearhart, 2021). Numerous studies have found that certain foods can elicit addictive like responses in the brain's reward system, paralleling substance addiction. The limbic system is involved in this process. The hypothalamic-pituitary-adrenal HPA axis and stress response are linked to using food as a reward or coping mechanism, and stress is associated with addictive behaviors (Rieder et al., 2016; Koob, 2020; Hardy et al., 2018).

We hypothesized that increasing rates of overweight, obesity and stress has been classified by the WHO as a major health concern of the 21st century (Mitchells and Volf, 2016). Our hypothesis suggests that perceived stress plays a significant role in the development of obesity, potentially mediated by FA. However, research on stress and food addiction in young female adults has yielded inconsistent results. FA is not yet

recognized as an eating disorder, posing challenges in identifying individuals experiencing its symptoms. Therefore, it is crucial to investigate the impact of stress on food addiction and obesity specifically in young females, aiming to improve their overall health status. The purpose of this research study was to investigate the prevalence of food addiction and to determine the relationship of food addiction with stress and obesity in female university students of Islamabad, Rawalpindi.

## **2. MATERIALS AND METHODS**

### **2.1. Participants**

The current study was conducted in different private and public universities of Islamabad and Rawalpindi. Data was collected through questionnaires. A total of 384 female university students were enrolled in the study. Participants were fully informed about the study's objectives and findings, and only those without medical history provided consent for enrollment while also retaining the option to withdraw from the study at any time. The entire process of the study was reviewed and approved by the Department of Public Health, Armed Forces Postgraduate Medical Institute, National University of Medical Sciences, Rawalpindi

### **2.2. Demographic characteristics**

In this section of data was collected for age, marital status, parental education, jobs and monthly incomes were collected.

### **2.3. Anthropometric Characteristics**

In the study, height and weight data were measured using standardized instruments. Body mass index (BMI) was calculated using the formula: by dividing weight (kg)/height (m<sup>2</sup>). The BMI was classified as <18.5 (underweight), 18.5-24.9 (normal), BMI 25-29.9 (overweight), and BMI >30.0 (obese).

### **2.4. Food addiction**

The Yale Food Addiction Scale (YFAS) was utilized to evaluate the participants' degree of food addiction. It helps researchers identify individuals with addictive like behaviors towards food. Including the YFAS in a study on food addiction, stress, and obesity allowed for standardized measurement and comparison of food addiction levels among participants. The data was collected by administering the scale and was analyzed alongside stress and obesity measures to explore the relationship between food addiction, stress, and obesity.

### **2.5. Perceived Stress**

The Perceived Stress Scale (PSS), a widely used tool for measuring individuals' subjective perception of stress levels in their lives and how individuals perceive and cope with stressors. By using PSS quantitative data was gathered on participants' self-reported stress levels and also examined the relationship between perceived stress and various

outcomes. This scale provided valuable insights into individuals' psychological experiences of stress.

## **2.6. Statistical Analysis:**

SPSS (Statistical Package for Social Scientists) V.26 was used for analysis of the data. Descriptive analysis was conducted to summarize the demographic characteristics of the participants, including age, gender, education level, and socioeconomic background. Pearson correlation used to measure the relationships between body weight, stress level, and food addiction.

## **3. RESULTS**

### **3.1. Socio Demographic Characteristics**

The socio demographics factors are shown in Table 1. The student's socio-demographic characteristics revealed that 62% of females were in the age group of 21 to 25 years, with the majority being unmarried (99.0%). Approximately 62.0% had an average monthly income, and the majority were day scholars (66.7%). The distribution of students across semesters was fairly balanced, with 27.3% in the 4th semester, 22.7% in the 2nd semester, and 21.6% in the 6th semester. The study found that the majority of fathers (71.6%) had an educational background, with 60.4% employed in the private sector. Overall, the students represented a young, predominantly unmarried population with some financial resources and diverse academic backgrounds. The majority of students (76.0%) did not have any medical history and chronic illnesses (76.8%), indicating that they were generally free from pre-existing health conditions. However, it is worth noting that a considerable number of students (25.5%) reported having allergies.

**Table 1: General Characteristics of Female University Students**

Variables		Frequency (N)	Percentage (%)
Age	18-21	146	38.1
	22-25	238	62
Marital Status	Single	380	99.0
	Married	4	1.0
Economic Status	Low	115	29.9
	Average	238	62.0
	High	31	8.1
Hostelite/Day scholar	Day scholar	256	66.7
	Hostelite	128	33.3
	1 <sup>st</sup>	35	9.1
	2 <sup>nd</sup>	87	22.7
Semester	3 <sup>rd</sup>	13	3.4
	4 <sup>th</sup>	105	27.3
	5 <sup>th</sup>	7	1.8
	6 <sup>th</sup>	83	21.6
	7 <sup>th</sup>	6	1.6
	8 <sup>th</sup>	49	12.5
Parent education	Educated	274	71.4
	Illiterate	110	28.6
Father job	Government	67	22.7
	Private	232	60.4
	Labor	65	16.9
Medical history	Yes	92	24.0
	No	292	76.0
Chronic illness	Yes	89	23.2
	No	295	76.8
Allergies	Yes	98	25.5
	No	286	74.5

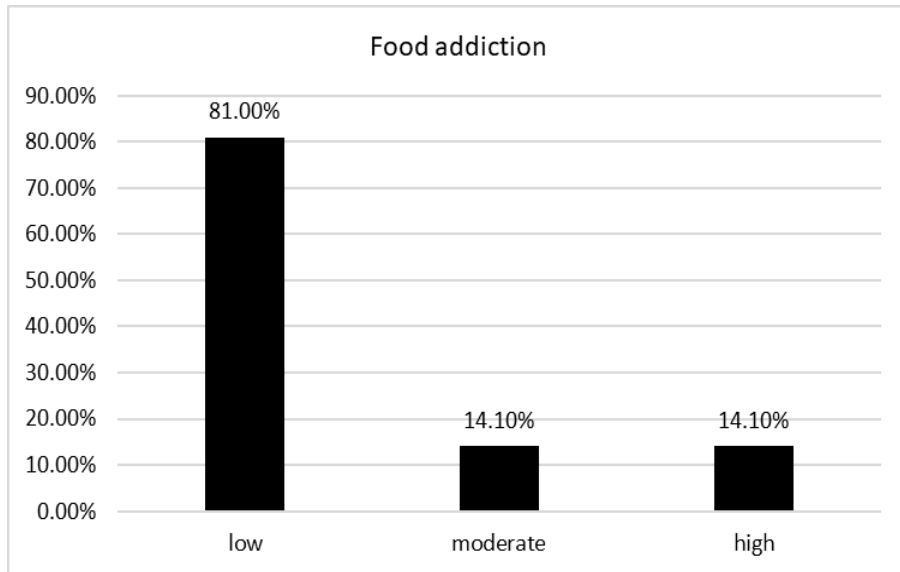
Test applied: Descriptive statistics (Simple means+ Frequencies & Percentages)

Table no 2 shows the distribution of body mass index among the subjects. The study concluded that majority of students (62.0%) were of normal weight followed by underweight (19.0%) and overweight (14.0%).

**Table 2: BMI distribution among Female University Students**

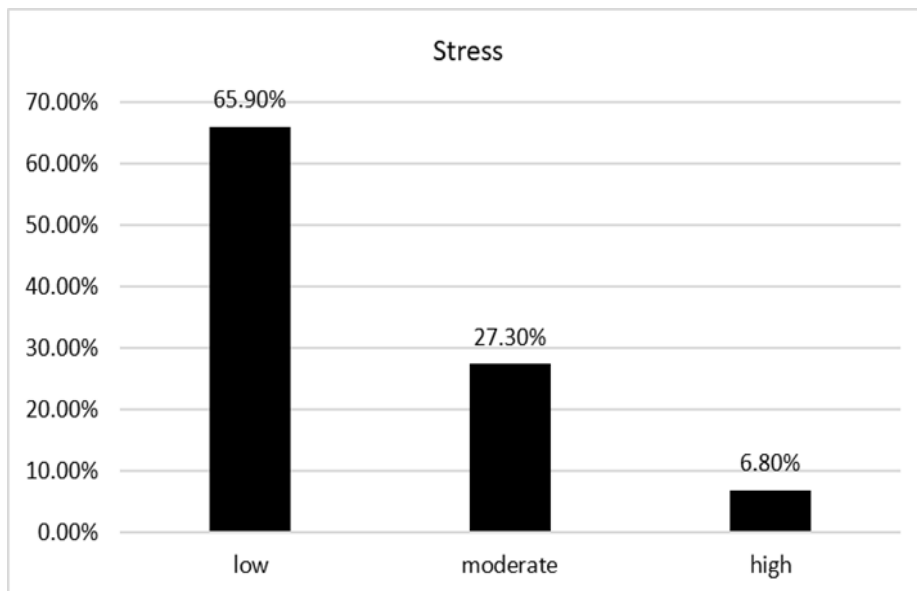
Body mass index	Frequency (N)	Percentage (%)
Underweight	73	19.0
Normal	238	62.0
Overweight	54	14.0
Obese	19	4.9

Test applied: Descriptive statistics (Frequencies & Percentages)



**Fig 1: Food Addiction in Female University Students**

Figure no 1 shows the prevalence of food addiction. Majority (81.0%) of the students were having low food addictions and (14.1%) were having high food addiction.



**Fig no 2: Stress among Female University Students**

Figure no 2 shows the prevalence of stress among the female university students. Majority (65.9%) of the students were having low stress and some (6.8%) were having high stress.

**Table 3: Food Addiction and Stress in association to Body weight of the Female University Students**

Variables		Body Weight				p-value
		Underweight	Normal	Overweight	Obese	
Stress	Low	73 (100)	180 (75.6)	0 (0)	0 (0)	0.000
	Moderate	0 (0)	58 (24.4)	47 (87.0)	0 (0)	
	High	0 (0)	0 (0)	7 (13.0)	19 (100)	
Food Addiction	Low	73 (100)	238 (100)	0 (0)	0 (0)	0.000
	Moderate	0 (0)	0 (0)	54 (100)	0 (0)	
	High	0 (0)	0 (0)	0 (0)	19 (100)	

Test applied: Chi square test: Significance level at  $P < 0.001$

Table no 3 shows the stress and food addiction in association to the body weight of the subjects. A highly significant association ( $p < 0.001$ ) was recorded for both stress and food addiction with body weight of the students.

**Table 4: Association of Food Addiction with Stress in Female University Students**

Variables		Food addiction			p-value
		Low	Moderate	High	
Perceived Stress	Low	253 (81.4)	0 (0)	0 (0)	0.000
	Moderate	58 (18.6)	47 (87.0)	0 (0)	
	High	0 (0)	7 (13.0)	19 (100)	

Test applied: Chi square test: Significance level at  $P < 0.001$

Table no 4 shows the association of food addiction with stress level of the students. A highly significant ( $p < 0.001$ ) association was found between food addiction and stress levels.

#### 4. DISCUSSION

Our aim in this study was to examine relationships among food addiction, perceived stress, and BMI. The study by (Akhter et al., 2018) analyzed the relationship between student's demographic state, eating habits, nutritional status and academic performance in Lahore, Pakistan. Their findings are consistent with the current study, which included primarily unmarried students (99.0%) with an average monthly income. Another similar

study by (Ahmed et al., 2022) assessed the nutritional status of undergraduate students in Bahawalpur where the majority of students were day scholars (87.6%) with an average family income of 38.0%. The current study found that the majority of students (76.0%) had no medical history, and most students (76.8%) were not suffering from chronic illnesses. However, some students (25.5%) reported having allergies. These findings align with a cross-sectional study by (Strang et al., 2013) on weight perception and trends among female college students in Karachi, where most students (79.8%) did not report any medical history. (Rab et al., 2008) conducted a study on anxiety and depression levels in female medical students in Pakistan, finding that most students (79.5%) had no medical history, but some (25.6%) had chronic illnesses. (Noorullah et al., 2023) evaluated depression, anxiety, and sleep quality among female students in a university environment, revealing that most female students (87.3%) did not have medical problems, and some (23.5%) reported food allergies.

The current study concluded that the mean weight and mean height of the students was 56.0(kg) with an SD of 9.2 and 159.8 (cm) with an SD of 6.4% respectively. Whereas the mean body mass index was 21.8 kg/m<sup>2</sup> with an SD of 4.4. The study concluded that the majority (62.0%) were normal, followed by underweight (19.0%) and overweight (14.0%). The present study's findings align with those of a comparative investigation on the nutritional status and food intake of female students at the University of Agriculture Peshawar (Shakoor et al., 2017). The mean weight of the students was 52.89 ± 9.0. The mean height was 156.9 ± 12.7. The mean body mass index was 21 ± 3.48. The overall nutritional status showed that most (63.0%) were normal, followed by underweight (24.1%), and some (12.8%) were overweight. (Hasan. 2018) surveyed at Rajshahi University Bangladesh to evaluate the body weight of university students based on gender. The mean height of female students was 157.17 ± 5.35 (cm), and weight was 48.7 ± 6.5 (kg). The mean Body mass index was 20.5 ± 2.2 kg/m<sup>2</sup>. Most (69.5%) of the students had normal body mass index. Female students at Tabriz University in Iran had their body image and its relationship to sociodemographic and nutritional characteristics assessed (Alipour et al., 2015). This study concluded that most students (81.0%) suffered from mild food addiction and (14.1%) severe food addiction. These results align with research that looked at how gender and body mass index affected the relationship between eating disorders and food addiction among university students (Yu et al., 2018). Their study also concluded that some female students (16.6%) suffer from severe food addiction, while most (77.7%) suffer from mild food addiction. (Sanlier et al., 2016) found associations between body image, depression, food addiction, and BMI in college students. This study concluded that some female students (15.9%) suffer from severe food addiction, and the majority (79.5%) suffer from mild food addiction. (Cebioglu et al., 2022) measured the effect of mindful eating on food poisoning in college students they found that the majority (82.6%) had mild food addiction. (Jahrami et al., 2021) assessed the relationship between phobia symptoms, insomnia, and food addiction in young adults. The study concluded that some adult women (16.8%) suffer from severe food addiction.



The current study found that a proportion of subjects (6.8%) had high levels of stress. This aligns with previous research conducted by (Forushani et al., 2011) on college women, which concluded that some students (6.4%) had high-stress levels. (El-Ansari et al., 2015) investigated the impact of perceived stress on academic performance in Islamabad and found a high percentage of students (6.3%) reporting stress. Nagma et al. (2015) evaluated the association of perceived stress with menstrual functions in female university students and concluded that some female students (6.9%) had high perceived stress levels. Both stress and food addiction were significantly correlated with student's body weight ( $p < 0.001$ ) in this study. Several studies have found a significant correlation between stress, food addiction, and body weight. (Lopez-Lopez et al., 2021) investigated the relationship between food addiction, saturated fat, and BMI in adults, showing that eating addiction predicts higher BMIs. (Sanlier et al., 2016) found a significant link between stress, BMI, and food dependency. (Ahmed et al., 2017) examined the frequency of food addiction and its association with BMI, revealing a substantial correlation. (Lin et al., 2020) explored the correlation between perceived stress, food addiction, and BMI, observing a significant relationship. Results showed a significantly significant ( $p < 0.001$ ) correlation between stress and food addiction. These results are consistent with research on how food addiction and stress affect college students in Taiwan (Lin et al., 2021). Food addiction and perceived stress were shown to be highly significantly correlated ( $p < 0.001$ ). The correlation between food addiction and perceived stress was examined by (Lin et al., 2019). Food addiction and perceived stress were shown to be highly significantly correlated ( $p < 0.001$ ).

Further, investigation from the angle of sex differences may provide valuable insights. The limitation of the study was its cross-sectional design. The study focused on a specific demographic and did not consider other potential confounding variables that could influence the relationship.

## 5. CONCLUSION

In conclusion, these results indicate a link between food addiction, stress, and body weight among female university students in Islamabad and Rawalpindi. Further research and interventions may be necessary to address these issues and promote healthier behaviors among this population. Recommendations for future research include larger and more diverse samples, consideration of additional variables, and exploration of individual coping mechanisms. Addressing these recommendations will contribute to a better understanding of the relationship between stress, food addiction, and body weight.

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**Conflicts of Interest:** The authors declare no conflict of interest

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