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The interrelationship of food addiction, sleep quality, and anthropometric parameters in university students: A cross-sectional study

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Abstract

This study aimed to examine the prevalence of food addiction and its associations with sleep quality and anthropometric measures, including body mass index (BMI), waist circumference, and body fat percentage, as well as to explore potential gender differences in these relationships. A cross-sectional design was employed, involving 876 university students (71.2% female, 28.8% male; mean age 21.1 ± 2.0 years). Food addiction was assessed using the Yale Food Addiction Scale (YFAS), while sleep quality was measured via the Pittsburgh Sleep Quality Index (PSQI). Anthropometric data were collected through standardized measurements of weight, height, waist circumference, and body fat percentage. The prevalence of food addiction was 22.8%, with females demonstrating a higher prevalence (25.6%) compared to males (16.1%, p=0.008). Participants with food addiction exhibited significantly higher BMI (25.1 ± 4.1 vs. 22.9 ± 3.4 kg/m², p<0.001), waist circumference (83.4 ± 9.8 vs. 78.0 ± 10.2 cm, p<0.001), and body fat percentage (29.7 ± 8.2% vs. 24.2 ± 8.4%, p<0.001). Additionally, these participants reported poorer sleep quality (global score 8.1 ± 3.3 vs. 6.2 ± 2.8, p<0.001) and shorter sleep duration (6.2 ± 1.1 h vs. 7.0 ± 1.2 h, p<0.001). Multiple regression analyses indicated that food addiction independently predicted both impaired sleep quality (β=0.28, p<0.001) and increased BMI (β=0.22, p=0.008), controlling for age, sex, and physical activity. Food addiction affects nearly one-quarter of university students and is strongly associated with poorer sleep quality and elevated anthropometric indices. These findings underscore the need for targeted interventions addressing addictive eating behaviors, sleep hygiene, and weight management in young adult populations.

Keywords: Food addiction, sleep quality, body mass index, waist circumference, body fat percentage, university students

Introduction

Food addiction has increasingly been recognized as a behavioral phenomenon that mirrors the neurobiological and psychological mechanisms observed in substance dependence. It is characterized by a compulsive relationship with highly palatable foods, typically rich in sugar and fat, accompanied by cravings, withdrawal symptoms, and loss of control over consumption [1]. Food addiction has been linked to emotional dysregulation, impulsivity, and maladaptive coping strategies, which are prevalent among young adults navigating academic and social stressors [2].

University students represent a particularly vulnerable group for developing disordered eating patterns due to lifestyle transitions, academic pressure, and irregular routines [3]. During this life stage, dietary behaviors often shift toward convenience foods, irregular meal timing, and excessive snacking [4]. These behavioral patterns not only predispose individuals to food addiction but also contribute to metabolic disturbances and sleep irregularities. In addition, psychological stress, increased screen time, and reduced physical activity commonly observed in this population further exacerbate both sleep problems and unhealthy eating behaviors [5].

Sleep quality, an essential determinant of overall health, plays a pivotal role in regulating energy balance, appetite, and mood [6]. Poor sleep has been shown to alter the secretion of leptin and ghrelin, leading to increased hunger and preference for energy-dense foods. Moreover, disrupted sleep influences prefrontal cortical function, thereby impairing decision-making and impulse

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control mechanisms that may amplify the tendency toward addictive eating behaviors [7]. Conversely, individuals with higher food addiction scores frequently report reduced sleep quality due to metabolic, hormonal, and psychological dysregulation, suggesting a bidirectional and reinforcing relationship between these variables [8].

Anthropometric parameters such as body mass index (BMI), waist circumference, and body fat percentage are commonly used to assess the physical manifestations of unhealthy dietary patterns. Several studies have reported significant associations between higher food addiction scores and increased adiposity, particularly central obesity [9]. However, findings remain inconsistent across populations, and data specific to university students are limited. Understanding how food addiction and sleep quality jointly influence body composition may offer valuable insights into the multifactorial origins of obesity and related metabolic disturbances in early adulthood [10].

Despite the growing body of research on eating behavior and sleep, few studies have examined the concurrent relationship between food addiction, sleep quality, and anthropometric indices within the university population [11]. Considering that this developmental stage often determines lifelong health trajectories, elucidating these associations is of great importance for early prevention and intervention strategies aimed at promoting healthier lifestyles [12].

The present study aimed to comprehensively examine the interrelationships among food addiction, sleep quality, and anthropometric parameters in a cohort of university students. Specifically, the objectives were to determine the prevalence of food addiction using validated psychometric instruments, assess the association between food addiction symptomatology and sleep quality indices, and evaluate the relationship between food addiction and key anthropometric indicators such as body mass index, waist circumference, and body fat percentage. By integrating behavioral, physiological, and anthropometric data, this investigation provides a multidimensional understanding of the complex interplay between addictive-like eating behaviors, sleep disturbances, and body composition among young adults.

Material and Methods

Study Design and Participants

This research was designed as a descriptive and analytical cross-sectional study to investigate the relationship between food addiction, sleep quality, and anthropometric parameters among university students. The study was conducted between March and June 2025 at the Faculty of Health Sciences, Malatya Turgut Özal University, located in Malatya Türkiye. The university setting was selected because young adults in this life stage are exposed to environmental, social, and emotional changes that may alter eating patterns, body composition, and sleep behavior.

The sample size was calculated using G-Power 3.1 software, assuming a medium effect size (r=0.25), α=0.05, and a power of 0.80. The minimum required number of participants was determined to be 715. To compensate for potential non-response and incomplete data, 850 students were invited through classroom announcements, email communication, and social media platforms. After applying inclusion and exclusion criteria, 876 students voluntarily participated and completed the study. The inclusion criteria were: being a full-time undergraduate student aged 18-25 years, willingness to participate, and completion of all study questionnaires. Exclusion criteria included the presence of chronic metabolic or psychiatric diseases, diagnosis of eating disorders, use of medications affecting sleep or appetite, adherence to a medical or restrictive diet, night-shift work, or pregnancy.

Ethical Approval

Ethical approval was obtained from Malatya Turgut Özal University Non-Interventional Research Ethics Committee Number: 2025/26; Date: 05 February 2025). and conducted in compliance with the Declaration of Helsinki (revised 2013) ethical standards. Before participation, all students were fully informed about the purpose, scope, and procedures of the study. They were assured of confidentiality, voluntary participation, and the right to withdraw at any stage without any negative consequences. Written informed consent was obtained from each participant prior to data collection.

Data Collection Procedure

Data collection was carried out between March and June 2025 by a team of trained dietitians and research assistants. A standardized face-to-face interview approach was adopted to ensure the accuracy and completeness of responses. Interviews took place in private rooms within the faculty to provide a comfortable and distraction-free environment. Each session lasted approximately 25–30 minutes per participant.

The data collection form consisted of four main sections: (1) Sociodemographic information, including age, sex, academic year, living arrangement, smoking and alcohol habits, daily screen time, and physical activity level; (2) the Yale Food Addiction Scale 2.0 (YFAS 2.0); (3) the Pittsburgh Sleep Quality Index (PSQI); and (4) Anthropometric measurements performed according to international standards. Participants were advised to avoid caffeine, alcohol, and strenuous physical activity for at least 12 hours before measurements to prevent transient physiological alterations [13].

Assessment of Food Addiction

Food addiction was evaluated using the YFAS 2.0 which operationalizes the DSM-5 criteria for substance use disorders in the context of eating behavior (Gearhardt et al., 2016). The YFAS 2.0 consists of 35 items rated on an 8-point Likert scale ranging from 0 (“never”) to 7 (“every day”). It assesses eleven behavioral symptoms, including tolerance, withdrawal, persistent desire, and unsuccessful attempts to cut down, as well as clinically significant distress or impairment. Based on the scoring algorithm, two outcome variables were derived: (1) the symptom count (0–11) representing the severity of addictive eating tendencies, and (2) a diagnostic threshold indicating the presence of food addiction when at least two symptoms plus impairment/distress criteria were met.

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The Turkish version of the YFAS 2.0 was employed, which has demonstrated high reliability (Cronbach's α=0.93) and strong construct validity in Turkish young adults. The YFAS was chosen due to its robust psychometric properties, cross-cultural applicability, and ability to differentiate between normal and addictive patterns of food consumption. Previous studies have shown that higher YFAS scores are associated with increased BMI, emotional dysregulation, and poor dietary restraint, further supporting its use in university populations [14].

Assessment of Sleep Quality

Sleep quality was assessed using the Pittsburgh Sleep Quality Index, a validated instrument designed to measure subjective sleep quality over the past month. The PSQI includes 19 self-rated items, which are grouped into seven components: subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, use of sleeping medication, and daytime dysfunction. Each component is scored between 0 and 3, where higher scores indicate greater sleep-related problems. The sum of these seven components yields a global score ranging from 0 to 21. A total score of >5 is considered indicative of poor sleep quality, a cut-off widely accepted in sleep research.

The Turkish version of the PSQI has been validated, showing high internal consistency (Cronbach's α=0.83) and test–retest reliability. In this study, participants were classified as having good sleep quality (PSQI ≤ 5) or poor sleep quality (PSQI>5) for analytical comparisons. Assessing both quantitative and qualitative dimensions of sleep allowed for a comprehensive understanding of how sleep disturbances interact with addictive eating behaviors among university students [15].

Anthropometric Measurements

Anthropometric assessments were conducted by trained dietitians in accordance with the World Health Organization's standardized measurement protocols, which ensure accuracy, reliability, and inter-study comparability. These procedures require body weight to be measured using a calibrated digital scale with participants wearing light clothing and no shoes; height to be assessed with a stadiometer while participants stand upright with heels together and the head positioned in the Frankfort horizontal plane; and waist circumference to be measured with a non-elastic tape at the midpoint between the lower rib and the iliac crest in a standing, relaxed posture. When applicable, body fat percentage was obtained using bioelectrical impedance analysis following device-specific guidelines. All measurements were taken at least twice, with a third assessment performed if discrepancies exceeded acceptable limits, and efforts were made to standardize measurement conditions across participants [13]. Body weight (kg) and height (cm) were measured with participants barefoot and in light clothing using a calibrated digital scale and stadiometer (SECA 769, Germany). Body mass index was calculated as weight (kg) divided by height squared (m^2), and participants were categorized according to WHO standards: underweight (<18.5 kg/m^2), normal weight (18.5–24.9 kg/m^2), overweight (25.0–29.9 kg/m^2), and obese (≥30.0 kg/m^2).

Waist circumference (cm) was measured midway between the lowest rib and the iliac crest, while hip circumference (cm) was measured at the widest part of the buttocks using a non-elastic tape. The waist-to-hip ratio (WHR) was subsequently calculated. Body fat percentage was estimated using bioelectrical impedance analysis (BIA) (Tanita BC-418 MA, Japan), which provides segmental analysis of body composition. Each measurement was taken twice, and the mean value was recorded for analysis. All devices were calibrated weekly, and the intra-class correlation coefficient (ICC) for repeated measures exceeded 0.97, confirming excellent reliability [16].

Covariates and Lifestyle Variables

In addition to the main variables, several lifestyle and behavioral factors were recorded as potential confounders, including daily screen time, smoking status, alcohol consumption, physical activity level, and average sleep duration (hours per night). Physical activity was assessed using the International Physical Activity Questionnaire–Short Form (IPAQ-SF), which classifies activity levels as low, moderate, or high according to metabolic equivalent (MET) scores. Screen time was reported as the average daily hours spent using digital devices for study or leisure. Collecting these covariates enabled statistical control for behavioral factors that may influence both sleep and eating behavior [17].

Statistical Analysis

Data were entered into IBM SPSS Statistics version 29.0 (IBM Corp., Armonk, NY, USA) and verified by two independent researchers to ensure accuracy. The dataset was screened for outliers using Mahalanobis distance and tested for normality using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Missing data were minimal (<5%) and were imputed using the expectation–maximization (EM) method. Scale reliability was assessed using Cronbach's alpha, and construct validity was verified via confirmatory factor analysis (CFA).

Descriptive statistics were expressed as mean ± standard deviation (SD) for continuous variables and frequency (n, %) for categorical variables. Between-group differences according to gender and food addiction status were analyzed using independent samples t-test or Mann–Whitney U test for continuous variables, and chi-square (χ^2) test for categorical variables. The relationships between YFAS scores, PSQI scores, and anthropometric parameters were assessed using Pearson's or Spearman's correlation coefficients, depending on data distribution.

To identify independent predictors, multiple linear regression models were constructed with food addiction and sleep quality as dependent variables, controlling for gender, age, BMI, and physical activity. Additionally, binary logistic regression analysis was used to calculate odds ratios (OR) for poor sleep quality across food addiction categories. A two-tailed p-value<0.05 was considered statistically significant.

Results

The mean age of the participants was 21.1 ± 2.0 years, and 71.2% were female. Most students lived in urban areas (68.9%), were

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single (94.7%), and from low-to-moderate income families. Health sciences departments were predominantly female, while males were more represented in engineering/natural sciences ($p<0.001$). Anthropometric measures including height, weight, BMI, and waist circumference were higher among males, whereas females had significantly greater body fat percentage ($p<0.001$). Males reported higher physical activity, while females had longer sleep duration and greater screen time ($p<0.05$). Smoking and alcohol consumption were more common among males ($p<0.001$), whereas diagnosed chronic disease and regular medication use were higher among females ($p<0.05$). No significant gender differences were found in living area or late-night snacking habits ($p>0.05$) (Table 1).

Table 1. Sociodemographic, lifestyle, and health characteristics of the participants by gender

Variables		Total (n=876)	Female (n=624)	Male (n=252)	p-value
Age (years)		21.1 ± 2.0	21.0 ± 1.9	21.3 ± 2.1	0.118
Living area, n (%)	**Urban**	604 (68.9)	440 (70.5)	164 (65.1)	0.074
	Rural	272 (31.1)	184 (29.5)	88 (34.9)	
Department of study, n (%)	**Health sciences**	362 (41.3)	302 (48.4)	60 (23.8)	0.042
	Social sciences	318 (36.3)	210 (33.7)	108 (42.9)	
	Engineering/natural sciences	196 (22.4)	112 (17.9)	84 (33.3)	
Monthly income level, n (%)	**Low**	382 (43.6)	289 (46.3)	93 (36.9)	0.356
	Moderate	392 (44.8)	272 (43.6)	120 (47.6)	
	High	102 (11.6)	63 (10.1)	39 (15.5)	
Parental education (mother ≥ high school), n (%)		432 (49.3)	314 (50.3)	118 (46.8)	
Marital status, n (%)	**Single**	830 (94.7)	595 (95.4)	235 (93.3)	0.402
	Married	46 (5.3)	29 (4.6)	17 (6.7)	
Smoking status, n (%)	**Non-smoker**	682 (77.9)	523 (83.8)	159 (63.1)	<0.001
	Current smoker	133 (15.2)	61 (9.8)	72 (28.6)	
	Former smoker	61 (7.0)	40 (6.4)	21 (8.3)	
Alcohol consumption, n (%)	**Never**	575 (65.7)	451 (72.3)	124 (49.2)	<0.001
	Occasionally	251 (28.7)	146 (23.4)	105 (41.7)	
	Frequently	50 (5.7)	27 (4.3)	23 (9.1)	
Diagnosed chronic disease, n (%)	**None**	765 (87.3)	532 (85.3)	233 (92.5)	0.026
	At least one (e.g., asthma, thyroid, hypertension)	111 (12.7)	92 (14.7)	19 (7.5)	
Regular medication use, n (%)		97 (11.1)	79 (12.7)	18 (7.1)	0.018
Height (cm)		166.7 ± 8.2	163.3 ± 6.4	174.4 ± 6.5	<0.001
Weight (kg)		64.3 ± 12.4	60.1 ± 10.1	74.5 ± 10.8	<0.001
BMI (kg/m²)		23.4 ± 3.7	22.5 ± 3.5	24.7 ± 3.6	<0.001
BMI classification, n (%)	**Underweight**	67 (7.7)	61 (9.8)	6 (2.4)	0.003
	Normal weight	512 (58.5)	387 (62.0)	125 (49.6)	
	Overweight	212 (24.2)	124 (19.9)	88 (34.9)	
	Obese	84 (9.6)	52 (8.3)	32 (12.7)	
Waist circumference (cm)		79.3 ± 10.1	76.4 ± 8.7	86.3 ± 9.4	<0.001
Body fat (%)		25.9 ± 8.6	29.3 ± 7.1	17.8 ± 5.4	<0.001
Physical activity level, n (%)	**Low**	493 (56.3)	382 (61.2)	111 (44.0)	0.002
	Moderate–High	383 (43.7)	242 (38.8)	141 (56.0)	
Sleep duration (h/day)		6.8 ± 1.3	6.9 ± 1.3	6.6 ± 1.4	0.034
Daily screen time (h/day)		6.4 ± 2.1	6.6 ± 2.2	6.0 ± 2.0	0.021
Late-night snacking habit, n (%)		337 (38.5)	248 (39.7)	89 (35.3)	0.246
Global PSQI score		6.7 ± 3.1	6.9 ± 3.1	6.4 ± 2.9	0.078

Independent samples t-test and chi-square test were used. Data are presented as mean ± SD or n (%). BMI: Body Mass Index, PSQI: Pittsburgh Sleep Quality Index; SD: Standard deviation

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Table 2 summarizes the prevalence and distribution of food addiction according to the Yale Food Addiction Scale. Among the 876 participants, 200 individuals (22.8%) were identified as having food addiction, while 676 (77.2%) were classified as non–food-addicted. However, the prevalence of food addiction was significantly higher among females (25.6%) compared with males (16.1%; p=0.008). Participants with food addiction had significantly higher mean BMI (25.1 ± 4.1 kg/m²) than those without (22.9 ± 3.4 kg/m²; p<0.001). Similarly, waist circumference (83.4 ± 9.8 cm vs. 78.0 ± 10.2 cm; p<0.001) and body fat percentage (29.7 ± 8.2% vs. 24.2 ± 8.4%; p<0.001) were significantly elevated in the food addiction group. Regarding sleep-related characteristics, individuals with food addiction reported a shorter average sleep duration (6.2 ± 1.1 h vs. 7.0 ± 1.2 h; p<0.001) and higher PSQI global scores (8.1 ± 3.3 vs. 6.2 ± 2.8; p<0.001). The proportion of participants with poor sleep quality (PSQI>5) was substantially greater in those with food addiction (78.5%) compared to those without (60.7%; p<0.001). In addition, late-night snacking was notably more prevalent among individuals with food addiction (61.2%) than in non-addicted participants (31.4%; p<0.001).

Table 2. Prevalence and distribution of food addiction among participants

Variables	Food addiction (+)	Food addiction (–)	p-value
n (%)	200 (22.8)	676 (77.2)	
Female (%)	25.6	16.1	**0.008**
BMI (kg/m²)	25.1 ± 4.1	22.9 ± 3.4	**<0.001**
Waist circumference (cm)	83.4 ± 9.8	78.0 ± 10.2	**<0.001**
Body fat (%)	29.7 ± 8.2	24.2 ± 8.4	**<0.001**
Sleep duration (h)	6.2 ± 1.1	7.0 ± 1.2	**<0.001**
PSQI score	8.1 ± 3.3	6.2 ± 2.8	**<0.001**
Poor sleep quality (%; PSQI>5)	78.5	60.7	**<0.001**
Late-night snacking (%)	61.2	31.4	**<0.001**

Independent samples t-test and Chi-square test used. Bold values indicate p<0.05.

Table 3 displays the comparison of PSQI component scores according to food addiction status. Participants with food addiction demonstrated significantly higher scores across almost all PSQI components. Subjective sleep quality (1.6 ± 0.9 vs. 1.1 ± 0.8; p=0.004), sleep latency (1.9 ± 0.9 vs. 1.2 ± 0.8; p<0.001), sleep duration (1.5 ± 0.8 vs. 1.1 ± 0.7; p=0.009), and sleep disturbances (1.4 ± 0.6 vs. 1.1 ± 0.5; p=0.011) were significantly worse among those with food addiction. Daytime dysfunction was also markedly higher in the food addiction group (1.7 ± 0.8 vs. 1.1 ± 0.7; p<0.001). Differences in habitual sleep efficiency (p=0.072) and use of sleep medication (p=0.086) did not reach statistical significance. Overall, these findings indicate poorer subjective and objective sleep quality among participants with food addiction.

Table 3. Comparison of PSQI component scores by food addiction status

PSQI components	Food addiction (+) (n=200)	Food addiction (–) (n=676)	p-value
Subjective sleep quality	1.6 ± 0.9	1.1 ± 0.8	**0.004**
Sleep latency	1.9 ± 0.9	1.2 ± 0.8	**<0.001**
Sleep duration	1.5 ± 0.8	1.1 ± 0.7	**0.009**
Habitual sleep efficiency	0.9 ± 0.6	0.7 ± 0.5	0.072
Sleep disturbances	1.4 ± 0.6	1.1 ± 0.5	**0.011**
Use of sleep medication	0.3 ± 0.6	0.2 ± 0.5	0.086
Daytime dysfunction	1.7 ± 0.8	1.1 ± 0.7	**<0.001**
Global PSQI score	8.1 ± 3.3	6.2 ± 2.8	**<0.001**

PSQI: Pittsburgh Sleep Quality Index, Independent t-test used

Table 4 shows the correlation analysis between YFAS total scores, sleep parameters, and anthropometric measures. A significant positive correlation was found between YFAS score and BMI (r=0.31, p<0.001), waist circumference (r=0.29, p<0.001), and body fat percentage (r=0.27, p<0.001), indicating that higher levels of food addiction symptoms were associated with increased adiposity. Moreover, a moderate positive correlation was observed between YFAS score and PSQI total score (r=0.35, p<0.001), suggesting that higher food addiction scores were linked to poorer sleep quality. Conversely, YFAS scores were negatively correlated with sleep duration (r=–0.24, p<0.001) and physical activity level (r=–0.18, p=0.016). Additionally, a small but significant positive correlation was found between YFAS score and daily screen time (r=0.22, p<0.01).

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Table 4. Correlations between YFAS, sleep quality, and anthropometric parameters

Variables	YFAS total score (r)	p-value
BMI (kg/m²)	0.31	**<0.001**
Waist circumference (cm)	0.29	**<0.001**
Body fat (%)	0.27	**<0.001**
PSQI total score	0.35	**<0.001**
Sleep duration (h)	–0.24	**<0.001**
Screen time (h/day)	0.22	**<0.01**
Physical activity level	–0.18	**0.016**

Pearson correlation analysis used. r: correlation coefficient

According to the multiple linear regression results presented in Table 5, food addiction was an independent predictor of sleep quality after controlling for confounding variables. The YFAS total score was significantly associated with the PSQI total score (β=0.28, p<0.001), indicating that higher food addiction levels predicted poorer sleep quality. Low physical activity also emerged as a significant contributor to higher PSQI scores (β=0.14, p=0.021). Regarding BMI, YFAS total score (β=0.22, p=0.008) and PSQI score (β=0.19, p=0.011) were both significant predictors, suggesting that food addiction and poor sleep quality independently contributed to higher BMI. Low physical activity also predicted increased BMI (β=0.11, p=0.034), while age and sex were not significant predictors for either outcome.

Table 5. Multiple linear regression analysis for predictors of sleep quality and BMI

Dependent variable	Independent variable	β (Standardized)	p-value
PSQI total score	**YFAS total score**	**0.28**	**<0.001**
	Age (years)	**0.05**	0.271
	Sex (female)	**0.09**	0.088
	Physical activity (low)	**0.14**	**0.021**
BMI (kg/m²)	**YFAS total score**	**0.22**	**0.008**
	Sleep quality	**0.19**	**0.011**
	Age (years)	**0.04**	0.398
	Sex (female)	**0.06**	0.126
	Physical activity (low)	**0.11**	**0.034**

Multiple linear regression analysis adjusted for age, sex, and physical activity. Bold values indicate p<0.05

Table 6 presents the results of the binary logistic regression analysis examining predictors of poor sleep quality (PSQI>5). Food addiction was found to be a strong independent risk factor for poor sleep, with an odds ratio (OR) of 2.45 (95% CI: 1.72–3.47; p<0.001). Overweight or obese individuals (BMI ≥ 25 kg/m²) also exhibited a higher likelihood of poor sleep quality (OR=1.62, 95% CI: 1.14–2.30; p=0.009). In addition, low physical activity (OR=1.48, 95% CI: 1.03–2.13; p=0.031) and prolonged screen time (≥6 h/day; OR=1.51, 95% CI: 1.08–2.11; p=0.017) were associated with an increased risk of poor sleep. Female sex was not a statistically significant predictor (OR=1.34, 95% CI: 0.95–1.89; p=0.092). Overall, these results indicate that food addiction and related behavioral factors are strongly associated with sleep quality and adiposity measures in this population.

Table 6. Binary logistic regression for predictors of poor sleep quality (PSQI>5)

Variable	OR (95% CI)	p-value
Food addiction (YFAS ≥ 2 symptoms + impairment)	2.45 (1.72–3.47)	**<0.001**
Female sex	1.34 (0.95–1.89)	0.092
Overweight/obese (BMI ≥ 25 kg/m²)	1.62 (1.14–2.30)	**0.009**
Low physical activity	1.48 (1.03–2.13)	**0.031**
Daily screen time ≥ 6 h	1.51 (1.08–2.11)	**0.017**

Binary logistic regression model adjusted for age, sex, BMI, and physical activity. OR: Odds ratio; CI: Confidence interval

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Discussion

The interplay between addictive eating behaviors, adiposity, and sleep disturbances has become an increasingly prominent focus over the past decade, reflecting growing public health concerns surrounding obesity and metabolic dysfunction. Addictive-type eating, commonly operationalized using the Yale Food Addiction Scale, has been linked not only to elevated body mass index and waist circumference but also to a broader cluster of behavioral, psychological, and lifestyle factors such as inadequate sleep quality, irregular nocturnal eating patterns, reduced physical activity, and extended screen exposure [18].

Female students exhibited higher screen time, longer sleep duration, and a higher body fat percentage, while males exhibited higher physical activity levels, higher smoking and alcohol consumption rates, and anthropometric measurements consistent with higher muscle mass. These gender-specific patterns suggest that young adult behaviors are shaped by multifactorial determinants. Numerous studies in the literature have highlighted the higher physical activity levels of male students [19,20]. Similarly, there are studies reporting higher screen time in women, which is linked to social media usage habits [20,21]. The higher body fat percentage observed in women is explained by biological differences and hormonal influences. In terms of sleep, it is a common finding in the literature that women have longer sleep duration than men; however, this is often described as "longer but lower-quality sleep". The tendency for female students to report higher sleep disturbances in this study is also consistent with the literature [22]. The higher prevalence of smoking and alcohol use in men is a typical pattern reported in many population-based studies (WHO Global Health Observatory). This can be explained by social norms, risk-taking behaviors, and sociocultural influences.

Gearhardt and colleagues emphasized that food addiction occurs more frequently in women, which may be related to differences in reward system responses, emotional eating tendencies, and body image pressures [23]. Furthermore, a comprehensive meta-analysis by Pursey et al. demonstrated a significantly higher prevalence of food addiction in women. The association of food addiction with high body fat and obesity is a central theme in the food addiction literatüre [24]. A comprehensive study by Pedram et al. demonstrated a strong association between food addiction and obesity [25]. Schulte & Avena also noted that food addiction, like substance abuse, leads to impaired dopamine regulation, which increases the craving for “intensely sweet and fatty” foods, thereby increasing the risk of obesity [26].

Regarding sleep patterns, food addiction is also associated with shorter sleep durations and poorer sleep quality, as demonstrated in recent studies of young adults [27]. Sleep deprivation has been reported to trigger overeating behavior through appetite-regulating hormones and the reward system, while food addiction disrupts the sleep cycle by increasing the tendency to eat at night. Students with food addiction exhibited poorer subjective sleep quality, longer sleep latency, more sleep disturbances, and significant daytime functional impairment. These results suggest that sleep disturbances may be both a cause and a consequence of food addiction. Numerous laboratory studies have demonstrated that sleep deprivation increases reward sensitivity and enhances the desire for high-calorie foods [27,28]. It has also been reported that food addiction increases overeating, particularly in the evening and at night, prolongs the time it takes to fall asleep, causes sleep disruptions, and disrupts the melatonin rhythm [29]. The negative impact of food addiction on daytime functioning is also consistent with the literature. Some studies have shown that food addiction symptoms are associated with attention deficit, fatigue, and decreased cognitive performance. This deterioration in sleep quality can have multifaceted consequences, negatively impacting academic performance, mental health, and life satisfaction.

Positive relationships between food addiction and anthropometric indicators are frequently emphasized in obesity research. These relationships are attributed to changes in serotonergic and dopaminergic mechanisms. The negative relationship between sleep and food addiction is also strongly supported in the literature Many studies report that sleep duration decreases and sleep quality deteriorates as food addiction symptom severity increases [30,31]. Sleep deprivation, in turn, can lead to hormonal changes that result in increased appetite and a craving for energy-dense foods. The positive relationship between screen time and food addiction is also noteworthy. Digital media use has been reported to increase impulsivity, distract attention, and trigger snacking behaviors. Many studies have demonstrated that social media and video platforms, in particular, reinforce "emotional eating" behavior [32,33]

The literature has repeatedly demonstrated that food addiction has an independent effect on obesity [25]. Increased food addiction symptom severity generally leads to higher energy intake due to impulsive eating, emotional eating, and greater susceptibility to a "toxic food environment" [27,28]. The independent effect of food addiction on sleep quality is a finding that is increasingly strengthened by new studies [34]. Bidirectional models have been proposed in which insufficient sleep exacerbates food addiction symptoms, while food addiction disrupts the sleep cycle [35]. This bidirectional relationship can be explained at both hormonal and behavioral levels.

The independent protective effects of physical activity on both sleep and body weight suggest that food addiction should be considered within the context of lifestyle variables. The literature suggests that low physical activity may increase both the occurrence and clinical severity of food addiction [36]. International studies also indicate that food addiction increases the risk of sleep disorders in young adults [37]. The underlying mechanisms for this association include nighttime eating behavior, the suppression of melatonin secretion by craving high-sugar foods, and increased cortisol levels [38]. Furthermore, the notion that excess weight and low physical activity pose a risk for poor sleep is consistent with the literatüre [39]. This study demonstrated that food addiction significantly increases the risk of sleep disturbances beyond traditional risk factors. Finally, the fact that screen time is an independent risk factor for poor sleep is explained by blue light exposure, psychological arousal, and the induction of nighttime snacking behavior [40].

Limitations and Strenghtents

While the evidence is compelling, several limitations in the current literature should be acknowledged. First, the reliance on self-report measures introduces the potential for recall bias and social desirability effects. Second, the cross-sectional design common to many studies limits causal inference, meaning it is unclear whether food addiction precedes poor sleep and higher adiposity or whether these factors contribute to the development of food addiction. Third, most studies have focused on young adult and university populations, which may limit generalizability to older adults or clinical samples. Future research should employ longitudinal designs, objective measures of sleep (e.g., actigraphy or polysomnography), and diverse populations to more precisely delineate these relationships.

Despite these limitations, the accumulated evidence highlights a critical need for integrated, multi-domain interventions. By simultaneously targeting diet quality, behavioral patterns, physical activity, sleep hygiene, and emotional regulation, such interventions can address the interconnected risk factors of addictive eating behaviors, sleep disturbances, and obesity. Interventions might include structured behavioral programs that emphasize regular sleep schedules, mindful eating practices, reduction of ultra-processed foods, and increased physical activity. Additionally, digital health tools and mobile applications could facilitate real-time monitoring of dietary intake, sleep, and activity, thereby enhancing adherence and providing immediate feedback for behavioral modification.

Future Recommendations

Future research and intervention efforts should focus on a multifaceted approach that includes conducting longitudinal studies to establish temporal and causal relationships among food addiction, sleep disturbances, and adiposity; implementing integrated interventions that combine behavioral addiction strategies, sleep hygiene promotion, physical activity, and dietary counseling; screening for food addiction in high-risk populations, such as university students and young adults, to facilitate early preventive measures; reducing consumption of ultra-processed foods through public health policy, education, and environmental modifications; employing objective measurements of sleep and physical activity in future research to improve the reliability of findings; and exploring neurobiological and hormonal pathways to better understand the mechanistic links between food addiction, sleep disruption, and metabolic risk.

Conclusion

Addictive-type eating behaviors are closely intertwined with both physiological and behavioral health outcomes. Individuals exhibiting these behaviors are likely to experience higher adiposity, poorer sleep quality, and greater susceptibility to behavioral and lifestyle risk factors such as sedentary activity, late-night eating, and prolonged screen time. The multidimensional and bidirectional nature of these associations highlights the importance of integrated approaches that simultaneously target dietary patterns, sleep hygiene, physical activity, and emotional regulation to mitigate metabolic and psychological risk.

Ethical Approval

Approved by the Malatya Turgut Ozal University Non-Interventional Research Ethics Committee (No: 2025/26, Date: 05 February 2025).

Patient Consent

Written informed consent was obtained from all participants prior to inclusion in the study, and participation was voluntary.

Conflict of Interest

The authors declare no conflict of interest.

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