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Original Article

The Association Between Chronotypes, Eating Behavior, and Obesity Risk Among Undergraduate Students: A Cross-Sectional Study

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Abstract

Objectives: Individuals differ in their sleep and activity timings, aligning with their circadian rhythms and this situation is described within the chronotype concept. It is stated that people who prefer evening sleep and have longer sleep duration have a higher prevalence of overweight/obesity than those who prefer morning sleep and have adequate sleep duration. The process of starting university is a critical period for many students as they start to make their own food choices. The aim of our study is to evaluate the impact of chronotypes on obesity and unhealthy eating and accordingly assess university students' tendencies toward these behaviors.

Methods: In this cross-sectional study, individuals' body composition was determined by utilizing the bioelectric impedance method. The Morningness – Eveningness Questionnaire, the Night Eating Questionnaire and the 30-Item Mindful Eating Questionnaire were used to evaluate participants' chronotype categories, night eating status and mindful eating status, respectively.

Results: A total of 103 undergraduate students whose mean age is 21.4±3.1 and who comprise 80.6% (n=83) women participated in our study. No significant differences between chronotype categories and anthropometric measurements were found (p>0.05). Eating discipline scores of students from health-related departments were shown to be higher than those of students from other departments (p=0.000).

Conclusion: Even though the main hypothesis was not confirmed, this study focuses on promoting healthy eating behaviors among undergraduate students by increasing nutrition knowledge and enhancing mindful eating, with the ultimate goal of preventing obesity which is a significant public health concern today.

Keywords: Circadian rhythm, eating behavior, mindful eating, obesity, public health, unhealthy eating.

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The term "circadian" is used to describe the functions that happen in a 24-hour cycle and derives from the combination of the words "circa", meaning approximately, and "diem", meaning a day or 24 hours. Individuals differ in their sleep and activity timings, aligning with their circadian rhythms and this situation is described within the

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chronotype concept. Three different chronotype categories were identified: morning, evening, and intermediate types.[1] Research shows that early chronotype individuals sleep early at night and wake up early in the morning, so they have a better performance in the morning. Whereas evening types sleep late in the evenings and have a hard time waking up in the morning, so have a better performance in the afternoon. It is known that chronotypes not only protect one's physical and mental health but also affect one's eating behaviors. Additionally, early types show healthier eating behaviors and have more control over overeating than evening types. Therefore, they are prone to being healthy.[2]

According to the World Obesity Atlas, published by the World Obesity Federation in 2024, it is projected that the number of adults living with obesity, which was 0.81 billion in 2020, will increase to 1.53 billion by 2035.[3] Chronotypes, which reflect individuals' sleep timing and preferences in other behaviors, are not generally known to be associated with obesity. Even though a direct connection between weight gain and chronotype has not been described yet, evening chronotype is associated with negative health outcomes. It is stated that people who prefer evening sleep and have longer sleep duration have a higher prevalence of overweight/obesity than those who prefer morning sleep and have adequate sleep duration.[4] Another finding in the literature regarding chronotypes is that while morning types regularly have breakfast, evening types habitually skip it.[5] Moreover, evening types are associated with night eating syndrome (NES) and higher body mass index (BMI).[6] However, studies investigating the relationships between chronotype, healthy eating and obesity are limited.[7]

The process of starting university is a critical period for many students as they start to make their own food choices. During this period of life, students develop health-related habits that will impact their life when they become adults [8] and regardless of their existing eating habits and family habits, these behaviors can change due to friends and other factors and the tendency towards unhealthy food choices and negative eating behavior might increase.[2] Notably, young adults show decreased vegetable, fruit and whole grain consumption and higher intake of high-calorie and low-nutrient-dense food such as sugar-sweetened beverages and processed meats. Therefore, it is important to investigate the factors that impact young adults' and university students' nutrition habits to build their lifelong health, as they face more nutrition challenges than other age populations.[9]

Sleep problems are a crucial source of concern among university students around the globe and high stress levels, academic performance pressure, irregular academic and social plans, late usage of electronic devices, caffeine consumption and alcohol intake can be counted as the reasons.[10,11] Research indicates that young adults are more prone to an evening chronotype; they have a natural tendency for sleeping late and waking up late. Furthermore, it has been reported that this natural preference is associated with poor sleep quality.[11] There is a notable lack of research, particularly among undergraduate students in Türkiye, that integrates chronotype, night eating syndrome, mindful eating, and objective body composition measurements within a single study. Therefore, this study aims to fill this gap by simultaneously evaluating chronotype, night eating behavior, mindful eating, and detailed body composition parameters in a sample of university students, thereby providing a more comprehensive perspective on the behavioral and physiological pathways associated with obesity risk.

Materials and Methods

Study Design

In this cross-sectional study, an online survey was created by using Google Forms and the data collection process was conducted between October 2024 and February 2025. University students residing in Istanbul, Türkiye, comprised the study population, and participants were contacted via LinkedIn and Instagram through the announcement posters. Additionally, an announcement text that includes the project topic was prepared and sent via WhatsApp to groups that consist of undergraduate students from Istanbul, Türkiye. Participants who expressed interest in the study and met the inclusion criteria were contacted, and appointments for anthropometric measurements were scheduled at mutually convenient dates and times with the researcher. The ethical commission application was prepared according to the Helsinki Declaration ethical standards and approved by Bahçeşehir University's ethical commission (E-85646034-604.02.02-70060). A total of 147 individuals were contacted to participate in the study; however, 13 were excluded due to meeting exclusion criteria, 2 were excluded because they completed the questionnaire but did not have anthropometric measurements, 2 were excluded because they had measurements but did not complete the questionnaire, 6 were excluded due to being foreign nationals and, despite having both measurements and questionnaires, could not provide statistically meaningful data, and 21 were not included because a mutually convenient date and time could not be arranged. In the end, out of 147 people, a total of 103 individuals participated in the study. After the

completion of data collection and analysis, a post hoc power analysis was conducted using the GPower software (GPower 3.1.9.2, Düsseldorf, Germany) to evaluate the adequacy of the sample size. The analysis was based on the correlation coefficient between the chronotype total score and the night eating total score (r=–0.284). The significance level was set at α=0.05, and based on the final sample size (n=103), the achieved statistical power (1–β) was calculated as 90.1%. Informed consent form was taken from all the participants. Individuals who had been diagnosed with an eating disorder in the past, individuals who have sleep disorders, individuals who are working in shifts and individuals who did not sign the informed consent forms were excluded from the study. Participants' sociodemographic information and dietary habits were assessed using a questionnaire prepared by the researcher based on a literature review.

Anthropometric Measures

Height was measured using a stadiometer (Seca 769) with participants standing barefoot, feet together, and head positioned in the Frankfort plane. Individuals' body composition was determined by utilizing the bioelectric impedance method (Tanita RD-545-sv). With this bioelectric impedance analysis-based measurements, participants' body weight, BMI, body fat mass and percentage, fat-free mass and percentage were assessed. The analysis was conducted under standard conditions, considering factors such as at least four hours of fasting prior to analysis, avoiding measurements during participants' menstruation, the absence of metal accessories, and normal room temperature.[12] Moreover, participants' waist and hip circumferences were measured using a non-stretchable tape measure, and then their waist-to-hip ratios were calculated.

Chronotype Categories

Individuals' chronotype categories were determined by using the morningness – eveningness questionnaire. The Morningness – Eveningness Questionnaire (MEQ) was developed by Horne and Östberg[13] and its Turkish adaptation was carried out by Pündük et al.[14] The questionnaire consists of 19 questions. This questionnaire is used for evaluating morning and evening types in the human circadian rhythm. The instrument investigates patients' physical and psychological performances which take place over 24 hours and their preferred time periods for conducting these performances. The MEQ was administered to patients in person. Scoring differs between 16–86, with 16–41 indicating a definite evening type, 42–58 indicating an intermediate type and 59–86 indicating a definite morning type.

Night Eating Status

Participants' night eating status was determined via The Night Eating Questionnaire which is a screening survey that was developed by Allison et al.[15] and it consists of 14 questions. The survey comprises questions regarding morning appetite and day's first food intake, evening and night meals, food intake percentages after dinner, cravings, the control over night eating behavior, difficulty falling asleep, frequency of waking up to eat at night, awareness while night eating and emotional state. The first nine questions of the survey must be filled out by all participants. The following questions include a warning instructing participant who do not wake up at night or do not snack at night not to continue the survey. Questions 10–12 are filled out by participants who wake up at night and questions 13 and 14 are filled out by participants who snack at night. All items except for question number 7 are scored between 0–4 via a Likert-type scale. The seventh item assesses changes in mood throughout the day, and individuals who do not experience any mood variation receive a score of zero. Questions numbered 1, 4, and 14 are reverse-scored. Item 13 asks how aware individuals are of their nocturnal snacking in order to differentiate night eating syndrome from sleep-related eating disorder. However, it is not included in the total score. The total score ranges from 0 to 52, and participants with higher scores are presumed to have developed night eating behavior. In this questionnaire, individuals who score 25 or higher are considered to have developed NES. The questionnaire's Cronbach Alpha value is 0.69 and the survey demonstrates internal consistency. In this study, the Cronbach Alpha is 0.682. Additionally, the Turkish reliability and validity study was conducted by Atasoy et al.[16] in 2013.

Mindful Eating Status

Participants' mindful eating status was assessed using the 30-Item Mindful Eating Questionnaire (MEQ-30), which measures levels of mindful eating. The questionnaire was first introduced to the literature by Framson et al.[17] and its Turkish validity and reliability were established by Köse et al.[18] The MEQ-30 consists of 30 items designed to evaluate mindful eating in daily life. Each item is scored on a 5-point scale, with "never" scored as 1, "rarely" as 2, "sometimes" as 3, "often" as 4, and "always" as 5. While 20 items are scored reversely, questions numbered 1, 7, 9, 11, 13, 15, 18, 24, 25 and 27 are scored normally. The seven subscales of the questionnaire are: disinhibition, emotional eating, eating control, focus, eating discipline, awareness and interference. Getting a high score from each subscale

demonstrates that the individual has the feature that the subscale evaluates. Furthermore, a total mindful eating score is calculated from the questionnaire. When scoring the questionnaire, the mean of the subscales and the total score is calculated. MEQ-30 has been shown to be a valid and reliable tool for evaluating mindful eating in the Turkish population.

Statistical Analysis

The obtained data were analyzed by using SPSS software (version 30.0 Inc., Chicago). In all analyses, a p-value of <0.05 was considered statistically significant. Descriptive statistics were expressed as numbers, percentages, means, and standard deviations. The Kolmogorov-Smirnov test was used to assess the normality of the data distribution. Chronotype and mindful eating scores were evaluated according to BMI categories by utilizing one-way ANOVA test and post hoc Tukey-HSD test. The relationships between questionnaire scores and anthropometric measurements were examined using Pearson correlation analysis. In addition, scale scores were compared across independent groups according to gender, academic program, and the presence of a diagnosed disease using the t-test.

Results

General Characteristics Of Participants

A total of 103 undergraduate students whose mean age is 21.4±3.1 and comprise 80.6% (n=83) women participated in our study. Participants' mean BMI is 22.1±3.3 kg/m^2 and while 70.9% of them are categorized as normal, 17.4% of them are classified as overweight and obese. General characteristics of participants are shown in Table 1.

Table 1. General characteristics of participants (n=103)

Age (years)	21.4±3.1
Sex, n (%)	
Female	83 (80.6)
Male	20 (19.4)
Body weight (kg)	61.2±11.0
Body mass index (kg/m^2)	22.1±3.3
Body mass index categories, n (%)	
Underweight	12 (11.7)
Normal	73 (70.9)
Overweight or obese	18 (17.4)
Body fat mass (kg)	17.3±6.4
Body fat percentage (%)	28.1±7.6
Fat free mass (kg)	33.1±11.1
Fat free mass percentage (%)	54.4±15.5
Waist circumference (cm)	74.1±9.1
Hip circumference (cm)	99.0±7.2
Waist to hip ratio	0.75±0.1
Presence of diagnosed disease, n (%)	
Yes	17 (16.5)
No	86 (83.5)
Field of study, n (%)	
Health	66 (64.1)
Other	37 (35.9)
Grade, n (%)	
Prepatory year or 1st year	12 (11.7)
2nd year	48 (46.6)
3rd year	29 (28.2)
4th and above	14 (13.6)
Chronotypes categories, n (%)	
Morning type	19 (18.4)
Intermediate type	54 (52.4)
Evening type	30 (29.2)
Night eating syndrome categories, n (%)	
Night eating syndrome	7 (6.8)
Normal	96 (93.2)

Evaluation of Anthropometric Measurements According to Chronotype Categories

Table 2 demonstrates the evaluation of anthropometric measurements according to chronotype categories. No significant differences between chronotype categories and anthropometric measurements were found (p>0.05).

Correlation Between Survey Data and Anthropometric Measurements

In Table 3, the relationship between participants' questionnaire results and anthropometric measurements is examined. A weak negative correlation was found between chronotype total score and night eating score (R= -0.284; p=0.004). Between the night eating score and mindful eating score, a moderate negative significant correlation was found (R= -0.429; p<0.001). When evaluated according to waist circumference, significant negative correlations were found between the total mindful eating score (R= -0.199; p=0.044) and the disinhibition (R= -0.229; p=0.020) and eating control (R= -0.376; p=0.000) subscale scores.

Scale Outcomes in Relation to Participants' Gender, Field of Study, and Diagnosed Medical Conditions

The scores obtained from the questionnaires by the participants were examined in Table 4 according to various variables. The chronotype total score was found to be significantly higher in female participants than in male

Table 2. Distribution of anthropometric measurements by chronotype categories of the participants

	Evening type (n=30)	Intermediate type (n=54)	Morning type (n=19)	F	p
Body weight (kg)	59.5±12.9	62.5±10.9	60.3±7.5	0.764	0.469
Body mass index (kg/m^2)	21.2±3.6	22.5±3.2	22.3±2.7	1.688	0.191
Body fat mass (kg)	15.6±6.0	18.0±6.9	17.9±5.2	1.439	0.242
Body fat percentage (%)	26.4±8.0	28.5±7.9	29.2±5.6	1.065	0.349
Fat free mass (kg)	33.2±12.3	34.9±11.2	27.8±6.2	2.981	0.055
Fat free mass percentage (%)	55.8±15.5	56.1±15.5	47.2±14.0	2.578	0.081
Waist circumference (cm)	72.4±10.4	75.2±9.1	73.4±6.5	0.948	0.391
Hip circumference (cm)	97.4±7.9	99.8±7.2	99.1±5.9	1.105	0.335
Waist to hip ratio	0.74±0.06	0.75±0.05	0.74±0.04	0.458	0.634

participants (p=0.047). Moreover, while emotional eating is found to be significantly lower in female individuals (p=0.009); eating control was found to be significantly higher (p=0.015). Eating discipline scores of students from health-related departments were shown to be higher than those of students from other departments (p=0.000). In addition, the same score was observed to be higher among individuals with a diagnosed medical condition than among those without one (p=0.011).

Discussion

This study contributes to the literature by examining chronotype, night eating behavior, and mindful eating together with objective body composition measures in a young university population, providing a more comprehensive view of factors related to obesity risk. The main purpose of our study was to find a significant correlation between students' chronotype categories and obesity tendencies. Nonetheless, there was no significant correlation found between participants' anthropometric measurements and chronotype categories. This finding might be caused by the low study population. However, there is a study available in the literature with a similar sample size but a higher average age, which found significant correlations between chronotype categories and BMI, body weight, waist circumference, hip circumference, waist/hip ratio and body fat percentage.[19]

Circadian misalignment and insufficient sleep cause the brain's specific parts that are stimulated by food to activate. Therefore, endocannabinoid system changes and as a result, it can be understood that BMI and metabolic dysfunctions are in a strong relationship with sleep disorders. NES has been associated with a misaligned circadian rhythm, which is linked to delayed overall food intake, increased energy intake, and higher fat consumption.[20] In light of this information, we hypothesized that the night eating score would be higher in individuals who are evening types. Consequently, in agreement with prior research,[21–23] we found a significant correlation between the night eating score and chronotype total score. Thus, this finding may indicate that NES is more prevalent among evening chronotype individuals compared to other chronotypes.

Eating behavior and circadian rhythms have emerged as important factors in obesity etiology.[24] Additionally, NES is among the eating behaviors that are more commonly observed in people with obesity.[25] Awareness techniques have been shown to be beneficial in eating disorder treatment or prevention and weight management.[26] As shown in Table 3, the inverse relationship between NES scores and mindful eating scores may highlight the importance of incorporating mindful eating–based approaches in NES treatment. In agreement with our findings, Kılıçaslan et al.[27] have also found a significant negative relationship between the night eating total score and the mindful eating total score in psychiatric patients. This finding supports our findings in terms of observing a similar relationship across different groups.

Waist circumference can serve as a complementary measure to BMI for evaluating disease risk, as it is a marker of visceral adiposity.[28] Mindful eating is traditionally defined as approaching the act of eating with awareness, being fully present in the moment, and refraining from making judgments about one's own eating habits.[29] Additionally, it has been demonstrated that mindful eating supports weight loss and weight management and is beneficial for individuals with obesity and individuals with eating behavior disorders.[30] Lazarevich et al.[31] found in a study conducted among university students in Mexico with a mean age of 21.95±2.16 years that participants with higher BMI, waist circumference, and body fat percentage showed lower mindful eating compared to those with

Table 3. Relationships between survey results and anthropometric measurements

	Chronotype total score	Night eating total score	Disinhibition	Emotional eating	Eating control	Focus on eating	Eating discipline	Awareness	Interference	Mindful eating total score
Chronotype total score		R= -0.284, p=0.004	R= 0.106, p=0.285	R= 0.066, p=0.506	R= 0.002, p=0.984	R= 0.046, p=0.641	R= 0.153, p=0.123	R= -0.035, p=0.725	R= 0.244, p=0.013	R= 0.134, p=0.177
Night eating total score	R= -0.284, p=0.004		R= -0.283, p=0.004	R= -0.238, p=0.016	R= -0.182, p=0.066	R= -0.317, p=0.001	R= -0.347, p<0.001	R= -0.111, p=0.266	R= -0.221, p=0.025	R= -0.429, p<0.001
Body fat percentage	R= 0.121, p=0.225	R= -0.082, p=0.409	R= 0.087, p=0.381	R= -0.272, p=0.005	R= 0.002, p=0.985	R= 0.192, p=0.053	R= 0.110, p=0.267	R= 0.008, p=0.939	R= 0.161, p=0.104	R= 0.007, p=0.943
Fat free mass percentage	R= -0.159, p=0.109	R= -0.045, p=0.653	R= 0.115, p=0.246	R= 0.340, p=0.000	R= -0.092, p=0.354	R= -0.093, p=0.348	R= -0.340, p=0.000	R= 0.083, p=0.405	R= -0.019, p=0.850	R= 0.040, p=0.686
Waist circumference	R= 0.084, p=0.398	R= -0.060, p=0.548	R= -0.229, p=0.020	R= -0.191, p=0.054	R= -0.376, p=0.000	R= 0.006, p=0.954	R= 0.192, p=0.052	R= -0.005, p=0.956	R= -0.027, p=0.787	R= -0.199, p=0.044
Waist to hip ratio	R= 0.038, p=0.704	R= -0.042, p=0.676	R= -0.236, p=0.017	R= -0.106, p=0.287	R= -0.345, p=0.000	R= -0.035, p=0.727	R= 0.091, p=0.361	R= 0.008, p=0.936	R= -0.114, p=0.253	R= -0.204, p=0.039

Table 4. Scale results according to participants' gender, field of study, and presence of diagnosed disease

	Sex			Field of study			Presence of diagnosed disease		
	Female	Male	p	Health	Other	p	Yes	No	p
Chronotype									
Total score	48.6±9.9	44.5±8.6	0.047	48.6±10.2	46.3±8.92	0.121	50.8±9.4	47.2±9.8	0.085
Night eating									
Total score	16.1±5.1	15.6±4.3	0.335	16.3±5.6	15.5±3.6	0.208	17.7±7.2	15.7±4.3	0.070
Mindful eating									
Disinhibition	3.4±0.76	3.1±0.72	0.097	3.4±0.78	3.3±0.71	0.291	3.2±0.98	3.3±0.71	0.330
Emotional eating	3.2±0.99	3.8±0.96	0.009	3.2±1.1	3.5±0.92	0.093	3.0±1.1	3.4±0.98	0.087
Eating control	3.7±0.88	3.3±0.90	0.015	3.7±0.91	3.5±0.88	0.133	3.6±1.0	3.7±0.88	0.380
Focus on eating	3.3±0.50	3.1±0.46	0.096	3.3±0.55	3.2±0.36	0.099	3.3±0.63	3.3±0.47	0.399
Eating discipline	3.0±0.87	2.9±0.94	0.406	3.2±0.81	2.57±0.85	0.000	3.4±0.73	2.9±0.88	0.011
Awareness	3.1±0.35	3.1±0.4	0.229	3.1±0.34	3.1±0.39	0.377	3.1±0.33	3.1±0.37	0.428
Interference	3.5±0.79	3.4±0.73	0.182	3.6±0.78	3.47±0.79	0.248	3.7±0.77	3.50±0.78	0.136
Total score	3.3±0.44	3.2±0.37	0.347	3.3±0.45	3.2±0.35	0.093	3.3±0.56	3.3±0.39	0.487

normal parameters. Similarly, our findings also support the presence of an inverse relationship between mindful eating and waist circumference.

Men appeared to be more evening-focused than women according to the results of a meta-analysis where 164 studies were investigated that include a total of 186,289 people, in which 75,622 of them were men and 110,667 of them were women.[32] In our study, we also found that male participants acquired lower scores in the MEQ and therefore they are in the evening type category. On the other hand, there are several studies available that did not find a significant correlation between sex and chronotype total score.[33,34] In a study conducted with a total of 476 public employees and with a higher mean age, whereas our study included a younger population, the reduced Morningness-Eveningness Questionnaire (rMEQ) was administered, and no significant difference was found between males and females in terms of rMEQ scores.[34] Likewise, in a study conducted on nursing students aged between 18 – 25, no significant relationship was found between sex and chronotype categories.[33] The differences in the aforementioned demographic characteristics and sample sizes may be a factor to consider when comparing the findings regarding the relationship between sex and chronotype categories.

The population of our study comprised undergraduate students without having an exclusion criteria regarding their field of study. As can be interpreted from Table 1, more than half of the students in our study group were from health-related departments. According to the analysis outcomes, students who are studying in health-related departments are found to have higher eating discipline scores. Yanagihara & Narumi-Hyakutake conducted a study with 801 people and evaluated the general characteristics of participants according to their nutrition knowledge scores. The study comprised 52.9% students from health-related departments and found that they have higher eating knowledge than students from non-health-related departments.[9] The term nutritional knowledge is described as "an awareness of nutrients and their relevance to health and well-being, as well as the ability to obtain reliable information regarding foods and their appropriate inclusion in a balanced diet.[35] The possibility that students from health-related departments have higher nutrition knowledge may explain why a higher eating discipline score was observed in our study among these students.

This study has several limitations. Because students' food choices can be affected by their living conditions (such as residing in a dormitory or with family), not inquiring about participants' living conditions represents a limitation of this study. The exclusion criteria did not contain criteria concerning students' field of study. Students from the nutrition and dietetics department may have more extensive nutritional knowledge than students from other departments and therefore, their mindful eating levels might be expected to be higher. Since students from health-related departments comprise the majority of our sample, their exclusion might have led to different findings. Another limitation of our study is that the sample consisted predominantly of individuals with normal body weight. Therefore, the null findings should be interpreted with caution, and it should be noted that the results may not be generalizable to populations with a broader range of BMI. Additionally, physical activity levels of the participants and other lifestyle factors (such as alcohol consumption and smoking) were not questioned. Therefore, an interpretation could not be made between these factors and obesity risk among students.

Conclusion

In this study, no significant difference was found between students' chronotypes and anthropometric measurements. This finding may be attributed to more than half of the study sample falling within the normal BMI category and the relatively small sample size. Therefore, maintaining a large sample size and including participants according to their BMI categories may enable the attainment of more meaningful results. The total mindful eating score was found to be significantly correlated with various variables. Such findings support the view that interventions aimed at increasing mindful eating may serve as a potential tool in the treatment of obesity. Providing education on healthy nutrition may improve the low levels of mindful eating among students who do not study in health-related programs, and consequently, this could reduce their risk of developing diseases. In the future, conducting longitudinal and intervention-based research with different age populations and cultural contexts may demonstrate the correlation between chronotype categories and obesity, and potentially related sub-parameters better. Even though the main hypothesis was not confirmed, this study focuses on promoting healthy eating behaviors among undergraduate students by increasing nutrition knowledge and enhancing mindful eating, with the ultimate goal of preventing obesity which is a significant public health concern today.

Disclosures

Ethics Committee Approval: The study was approved by the Bahçeşehir University Ethics Committee (no: E-85646034-604.02.02-70060, date: 30/11/2023).

Informed Consent: Informed consent was obtained from all participants.

Conflict of Interest Statement: The authors have no conflicts of interest to declare.

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