Assessment of Association between Body Mass Index with Menstrual Characteristics and Self Esteem among Nursing Students

Hemşirelik Öğrencilerinde Beden Kitle İndeksi ile Menstrüel Siklus ve Benlik Saygısı Arasındaki İlişkinin Değerlendirilmesi

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Özet

Amaç: Beden kitle indeksinin artması bazı önemli sağlık sorununu da beraberinde getirmektedir. Bu problemlerden biri de menstual düzensizliktir. Aşırı stres, hormonal değişiklikler ve obezite gibi birçok faktör menstrüel düzensizliklere neden olabilmektedir. Bu çalışmanın amacı hemşirelik öğrencilerinde beden kitle indeksi ile menstrüel siklus ve benlik saygısı arasındaki ilişkiyi belirlemektir.

Gereç ve yöntemler: Tanımlayıcı ve kesitsel tipteki bu çalışma, hemşirelik bölümünde öğrenim gören 416 hemşirelik öğrencisinin menstrual siklus uzunluğu, menstrual dönem süresi ve periyodik menstrual kan kaybı, beden kitle indeksi ve benlik saygısı düzeyi değerlendirilmiştir. Ayrıca, öğrenci bigi formu ile yaş, vücut ağırlığı ve boy uzunluğu parametrelerini içeren demografik veriler alınmış ve ölçülmüştür.

Bulgular: Öğrencilerin yaş, boy uzunluğu, vücut ağırlığı ve beden kitle indeksi ortalamaları 20,94±1,67 yıl, 163,49±4,96 cm, 57,21±8,91 kg ve 21.42±3.31 kg/m2'ydi. Menstrüel siklus uzunluğu 346 kişide normal kabul edilen 21-35 gün arasında bulunmuştur. Menstrüel periyod süresi değerlendirildiğinde 307 bireyde 3-7 gün normal olarak kabul edilmiştir. Ayrıca, periyodik menstrüel kan kaybı 164 bireyde normal veya orta düzeyde olup, bunu hafif (<15 ped; 149 birey) ve ağır (>20 ped; 103 birey) düzey takip etmiştir. Bu bulgulara göre, beden kitle indeksi, menstrual siklus süresi, periyodik menstrual kan kaybı ve menstrual siklus uzunluğu arasında anlamlı bir fark bulunmuştur. Ayrıca, hemşirelik öğrencilerinin Rosenberg Benlik Saygısı Ölçeği'nden aldıkları puan 22.16±2.62 olarak hesaplanmıştır.

Sonuç: Hemşirelik öğrencilerinin beden kitle indeksi değerleri ile menstrüel siklus, menstrual süre ve menstrüel kan kaybı arasında istatistiksel olarak anlamlı bir korelasyon bulunmuştur. Ancak, beden kitle indeksinin benlik saygısı üzerinde anlamlı bir etkisi olmadığı bulunmuştur.

Anahtar Kelimeler: Beden kitle indeksi, menstrüel özellikler, benlik saygısı.

Abstract

Objective: An increase in body mass index brings many important health problems. One of them is menstrual irregularity. Many factors, such as excessive stress, hormonal changes, and obesity, can cause menstrual irregularities. This study aims to evaluate the connection of body mass index (BMI) with menstrual characteristics and self-esteem levels in nursing students.

Material and methods: In this descriptive and cross-sectional study, menstrual cycle length, menstrual period duration and periodic menstrual blood loss, body mass index, and self-esteem level were evaluated in 416 nursing students studying in the nursing department. In addition, demographic data including age, body weight, and height parameters with student information form were obtained and measured.

Results: The mean age, height, and weight of the students were 20.94±1.67 years, 163.49±4.96 cm, and 57.21±8.91 kg. The average of the BMI was 21.42±3.31 kg/m2. The length of menstrual cycle results which was 21-35 days called normal, was found in 346 subjects. In the assessment of the duration of the menstrual period, 3-7 days accepted as normal was found in 307 nursing subjects. Also, the periodic menstrual blood loss was normal or moderate in 164 nursing subjects followed by mild (<15 pads; 149 subjects) and heavy (>20 pads; 103 subjects). According to these findings, there was a significant difference between Body mass index, the duration of the menstrual period, the periodic menstrual blood loss, and the length of the menstrual cycle. Additionally, the Rosenberg Self-Esteem Scale of Nursing Students was found as 22.16±2.62 points.

Conclusion: Body mass index values of nursing students showed a statistically significant correlation between menstrual cycle, duration, and blood loss. However, it was found that body mass index had no significant effect on self-esteem.

Keywords: Body mass index, menstrual characteristics, self-esteem.

INTRODUCTION

Body mass index (BMI) is essential for anthropometric assessments. This shows the nutritional status of the subjects. Obesity causes a decrease in self-image and self-esteem and it results in social isolation, and depression (1-4,5). The BMI is classified as underweight, normal weight, overweight, and obesity (1,4). Also, there was an association between body fat, and age, gender, race, and geography (4). BMI values increase called obesity, or overweight, affects cardiovascular and cerebrovascular diseases, dementia, sleep pattern and infertility, menstrual cycle irregularities, and endometrial carcinoma. Endometrial carcinoma can be a major reason for obesity in the adult period (4,6-8) and may cause earlier sexual maturity and irregular menstrual cycle (6,8). It is influenced by genetic, nutritional, psychological, and hormonal factors (8,9). Moreover, obesity is becoming a growing public health problem and the major problem leading to mortality and morbidity, increases the risk for developing gynecological diseases which consist of the change in the menstrual cycle length (MCL), duration of the menstrual period (MPD) and periodic menstrual blood loss (PMBL) (10). Menstruation which is a significant sign of females' reproductive health, endocrine functions, and sexuality, is the most critical change and a normal physiological fact from menarche and continues until the menopause period (11-14), and it occurs once a month as a regular rhythmic period (10). The menstrual cycle is defined as the time between two menstruation and may be accepted as normal if the length is 21-35 days or 25-30 days. The MPD is considered normal if the duration is 3-7 days or 2-8 days, and the PMBL is known as normal, the blood loss is 15-20 pads (4,11-13). Menstrual irregularities represent deviations from the normal cycle. The deviations from the normal cycle consist of amenorrhea, menorrhagia, metrorrhagia, hypomenorrhea, hypermenorrhea, oligomenorrhea, and polymer (11,12). There are many reasons for menstrual irregularities, and the flow of a female's menstrual cycle includes physiological, inappropriate diet, lower age, hormonal changes, genetics, stress, serious medical conditions, and body mass index (8,10,12-16). Some studies showed a relation between BMI (extremely low and high BMI) and dysmenorrhea, while some studies showed no association between BMI and dysmenorrhea (17-21).

Self-esteem which is especially important in adolescence period, is both the evaluation component of the self-concept and good mental health. It is a satisfying sense and important parameter for the determination of healthy development in adolescence. This sense is known to grow gradually and to alter with maturation. Also, it estimates the many important life outcomes. Underweight or overweight can be stressful for adolescents and may lead to depression and low self-esteem (22). It is stated that low self-esteem is related to obesity or overweight and social functioning (22,23). A decrease in self-esteem affects body satisfaction and is a reason for unhealthy weight control behaviors (22). Self-esteem determines one's assessment of oneself and refers to a manner of approval or not. It signs the degree to which the individual makes and customarily maintains regarding herself. It is reported that subjects having menstrual disorders have low self-confidence, and depression (14). Several studies are researching the relationship between self-esteem and BMI (14,24-27). The overweight might be related to a decrease in body perception, and self-worth (28). BMI is a sign of both body image and self-esteem and a critical measurement. This affects subject satisfaction with physical appearance and plays a critical role in student adjustment in school settings (22-24,27,28).

Considering that body mass index may affect many conditions such as self-esteem, menstrual characteristics, and mental health, this study aimed to determine the relationship between body mass index, self-esteem, and menstrual cycle in nursing students.

MATERIALS AND METHODS

Design and Participants

This descriptive and cross-sectional study was conducted to determine the effect of the body mass index on the MCL, MPD PMBL, and Rosenberg Self-Esteem Scale (RBSS) in nursing students. The study was conducted with Nursing Department students of Cukurova University in Turkey in 2023.

Power analysis was conducted in the G*Power software to calculate the sample size. Based on the study by Soylu and Nazik (2022), with a 95% power and a 5% error rate, it was determined that at least 42 females needed to be included (9). By considering the possibility of the females wanting to leave the study, the study consisted of first and fourth-year 416 students aged between 18-24 and who agreed to participate in the study (participation rate 52.00%). No sample selection was performed in the study and the whole population was tried to be reached. However, 134 of the remaining students refused to participate in the study for various reasons and 250 students could not be included in the study due to various reasons such as absenteeism and incomplete completion of evaluation forms. Inclusion criteria were determined. Individuals who were studying in the Department of Nursing, who were older than 18 years, who had not undergone any surgical operation that could affect the results of the study in the last 1 year, and who had no communication problems were accepted to the study. In addition, not having a chronic health problem affecting metabolism such as neurological, psychiatric, or diabetes.

Instruments

The data of the study was collected using an information form, and Rosenberg Self-Esteem Scale;

The information form

This form contains four questions regarding the sociodemographic characters of the students (study year, age, gender, and city), and demographic characteristics (weight, height, and BMI) that might affect the menstrual cycle features and self-esteem was generated.

Rosenberg Self-esteem (RBSS)

The RBSS which consists of 63 items and has 12 subscales, is the most widely used in determining a person's self-esteem. The scale consists of 10 items. It measures four-point Likert type (1: strongly disagree, 2: disagree, 3: agree, 4: agree), and five of the questions are reverse coded. The scale Alpha internal consistency coefficient changed from 0.71 to 0.89 in literature (Çuhadaroğlu (1986), Tuğrul (1994), Güngör et al (1999) and, Haspolat and Kağan (29). Scores between 15 and 25 are accepted as normal; below 15 refer to low self-esteem, and above 25 indicates high self-esteem (30). Additionally, Cronbach's Alfa value was determined as 0.670 in this paper.

Menstrual Characteristics

In the assessment of menstrual characteristics, nursing students were asked about the characteristics of their menstrual cycle based on the past six months. In this study, the MCL was estimated as below (4):

A<21 days is accepted as polymenorrhea

B=21-35 days is accepted as normal

C>35 days is accepted as oligomenorrhea.

The MPD was evaluated as below:

A<3 days is accepted as low; B=3-7 days is accepted as normal, and C>35 days is accepted as high. Also, the periodic menstrual blood loss is researched and the classification is divided into three mild (<15 pads), moderate (15-20 pads), and heavy (>20 pads).

Data collection

Students were informed about the aim of the study, and both written and verbal consent was obtained from the students agreeing to participate in the study. One questionnaire called as Rosenberg Self-Esteem Scale was done in the lab. The anthropometric measurements including height with a stadiometer (0.1 centimeters in bare feet) and weight with a digital scale (0.1 kg. calibrated with precision) were performed on nursing students. Additionally, MCL, MPD, and PMBL were asked and recorded. The BMI was calculated as weight in kilograms divided by the square of the height of the subject in meters (kg/m²), and BMI was categorized, and if the value was <18.50, this was accepted as underweight. If the value was between 18.5 and 24.99, this was evaluated as normal weight. Later, if the BMI of ≥25 it is defined as overweight or obesity (1-4,5).

Ethical approval

The study was conducted in conformity with the Helsinki Declaration principles. Necessary ethical board approvals and institution authorizations were obtained for conducting the study. This study which was descriptive and cross-sectional was approved by the Clinical Researches Ethics Committee (protocol number: 2023/132-32 date:07.04.2023). All subjects were informed about the aim of the study, the voluntary nature of participation, and that they could withdraw from the study at any time.

Analysis of Data

The data was analyzed using SPSS 22.0 program. The data was determined using frequency, percentage, mean, standard deviation, minimum, and maximum values. One way ANOVA, and Chi Square test were used to compare means of two independent variables and to assess the categorical data. Also, the reliability was evaluated by Cronbach's Alfa. Statistical significance level was considered as $p<0.05$.

RESULTS

The mean age, height and weight of the students were 20.94±1.67 years, 163.49±4.96 cm, and 57.21±8.91 kg. The average of the BMI was 21.42±3.31 kg/m² **(Table 1)**.

Of the students studying at Çukurova University, 52.9% live in Adana, 9.10% in Hatay, 4.6% in Osmaniye, 7.21% in Mersin, 7.2% in Kahramanmaraş and 18.99% in Southeastern Anatolia. 25.0% of nursing students were in the first year students, 23.46% in the second year, 20.00% in the third year, and 31.54% in the fourth year. More than half of the students chose the department willingly (60.4%), as their first choice (54.6%), and 57.4% were satisfied with their department.

The length of menstrual cycle results were analyzed and <21 days or polymenorrhea was found in 15 (3.61%) students. 21-35 days called normal was found in 346 (83.17%) subjects, and 55 (13.22%) subjects had>35 days named as oligomenorrhea. Moreover, in the assessment of the duration of the menstrual period, <3 Days accepted as low was found in 9 (2.16%) subjects, 3-7 days accepted as normal was found in 307 (73.80%) nursing subjects, and >35 days stated as high was found in 100 (24.04%) subjects. Also, the periodic

Table 1. Demographic Data and Self Esteem Scale Scores of Nursing Students				
Demographic Data (n=416)	**Mean**	**Standard Deviation (SD)**	**Min.**	**Max.**
Age (year)	20.94	1.67	18.00	24.00
Height (cm)	163.49	4.96	150.00	178.00
Weight (kg)	57.21	8.91	40.00	80.00
BMI (kg/m²)	21.42	3.31	15.06	32.87
Rosenberg Self Esteem Scale Score	22.16	2.62	17.00	31.00

n=Participants number; Min.:Minimum; Max.: Maximum

menstrual blood loss was normal or moderate in 164 (39.42%) nursing subjects followed by mild (<15 pads; 149-35.82% subjects) and heavy (>20 pads; 103-24.76 subjects) **(Table 2)**.

The relation of body mass index with the menstrual characteristics and self-esteem anthropometric parameters is shown in Table 3. According to these findings, there was a significant difference between BMI, MCL, MPD, and PMBL (p<0.001). Additionally, in Table 1, the mean (SD) value of the Rosenberg Self-Esteem Scale of Nursing Students was found 22.16 (2.62). The highest score obtained from this scale is 31.00 points and the lowest score is 17.00 points. Also, for the four groups called underweight, normal weight, overweight, and obese, the means of Rosenberg Self Esteem Score were calculated as 22.37±2.41points, 22.15±2.74 points, 22.02±2.27 points, and 20.75±2.62 points, respectively. The lowest value was obtained from the obese group, while the highest value was found underweight group. Additionally, Rosenberg's Self-esteem results were analyzed and <15 points were not found in nursing students. 15-25 points called normal self-esteem were

found in 70 subjects underweight; 217 subjects called normal weight; 41 subjects having overweight, and 8 subjects having obese. Moreover, >25 points called high self-esteem were found in 19 subjects being underweight; 54 subjects called normal weight; and 7 subjects having overweight **(Table 3)**.

DISCUSSION

This study was conducted to evaluate the nursing students's menstrual characteristics, weight, height, body mass index, and self esteem and to determine the effects of BMI on menstrual characteristics. The BMI means in this paper was 21.42±3.31 kg/m2. The National Institute of Health (NIH) uses BMI to identify a subject as underweight, normal weight, overweight, or obese (31). In the data published from 1988 to 2016, age-related obesity prevalence in the United States increased progressively from 22.9 to 39.6 percent. Additionally, obesity which is prodrome of a chronic disease is increasing worldwide. This situation leads to increased health expenditures and worsening health conditions in many countries. In 2015, information shows that approximately 604 million adults having a BMI of 30 were present and these may be classified them as obese. The main danger is that there have been an increase in the obesity prevalence around the world since 1980 and many countries, the prevalence has doubled (31).

Also, in our population, the underweight subjects were 89 (21.39%), while the subjects having normal weight, overweight and obesity subjects were 271 (65.14%), 48 (11.54%), and 8 (1.93%), respectively. 13.47% of our nursing population were seen as BMI greater than 24.99 and of these, 11.54% were overweight and 1.93% were obese. The obesity prevalence was lower in this paper and the possible reason for this may be that our study group was between 18-24 years of age and consisted of healthy young adults. The nursing subjects of our study groups were asked presence of endocrine disease or whether they use chronic medication or not. Moreover, those were excluded. In another study, out of

Table 2. The evaluation of the menstrual characteristics of nursing students	
Menstrual characteristics (n=416)	**N**
Length of the menstrual cycle <21 21-35 >35	15 (3.61%) 346 (83.17%) 55 (13.22%)
Duration of the menstrual period <3 days 3-7 days >7 days	9 (2.16%) 307 (73.80%) 100 (24.04%)
Periodic menstrual blood loss <15 ped 15-20 ped >20 ped	149 (35.82%) 164 (39.42%) 103 (24.76%)

n=Participants number

Table 3. The relation of body mass index with the length of the menstrual characteristics and Self esteem

Anthropometric parameters		Underweight (n=89)	Normal weight (n=271)	Owerweight (n=48)	Obesity (n=8)
The length of the menstrual cycle	Normal cycle (307)	57 (18.57%)	219 (71.33%)	31 (10.10%)	0 (0.00%)
	Anormal cycle (n=109)	32 (29.36%)	52 (47.70%)	17 (15.60%)	8 (7.34%)
p value	**<0.001**				
The duration of the menstrual period	Low	11 (73.33%)	4 (26.67%)	0 (0.00%)	0 (0.00%)
	Normal	54 (15.61%)	247 (71.39%)	45 (13.01%)	0 (0.00%)
	High	24 (43.64%)	20 (36.36%)	3 (5.45%)	8 (14.55%)
p value	**<0.001**				
The periodic menstrual blood loss	Mild	29 (19.46%)	108 (72.48%)	10 (6.71%)	2 (1.34%)
	Moderate	42 (25.61%)	105 (64.02%)	17 (10.37%)	0 (0.00%)
	Heavy	18 (17.48%)	58 (56.31%)	21 (20.39%)	6 (5.83%)
p value	**<0.001**				
Rosenberg Self Esteem Scale	<15points (Low-self esteem)	0 (0.00%)	0 (0.00%)	0 (0.00%)	0 (0.00%)
	15-25 (Normal self esteem)	70 (20.83%)	217 (64.58%)	41 (12.20%)	8 (2.42%)
	>25 (High self esteem)	19 (23.75%)	54 (67.5%)	7 (8.75%)	0 (0.00%)
p value	0.405				
Rosenberg Self Esteem Scale (mean+SD)		22.37 (2.42)	22.15 (2.75)	22.02 (2.27)	20.75 (2.19)
p value	0.238				

n=Participants number; p value: Significance level; SD:Standard deviation

240 Nepal nursing students, 52 subjects (21.67%) were underweight (<18.5kg/m2), and 141 subjects (58.75%) were normal weight, and 47 subjects (19.58%) were overweight and obese (35 subjects, 14.58% overweight and 12 subjects, 5.00% obese). Also, there was a positive association between overweight and menstrual abnormalities. BMI was a good sign of menstrual irregularity as increased BMI was associated with menstrual abnormality (MCL MPD and PMBL (4).

The obesity prevalence is directly proportional to age. Adults are at higher risk. This may be related to insulin resistance (4,9). Some differences such as geography, climate, and race could be a reason for overweight and obesity (4). Additionally, in another study performed with female healthcare workers to explain the effects of four different age groups of employment on menstrual cycle, duration, and bleeding, the proportion of healthcare workers working during 20 and over years had abnormal MCL, abnormal MPD, and abnormal PMBL were 42.9%, 47.9%, and 67.2%, respectively. Of those 50.4% was called dysmenorrhea. Moreover, the prevalence of dysmenorrhea was 59%, the abnormal amount of menstrual bleeding was 48.7%, the

abnormal menstrual duration was 32%, and irregular MCL was 154 (30.6%). It has been reported that prolonged standing is unlikely to be a cause of abnormal menstrual characteristics, but that carrying heavy loads may affect this condition (32). Moreover, the menstrual cycle varies according to the balance between the hypothalamus-pituitary-ovarian axis and endogenous hormones. Changes in this axis can affect menstrual characteristics (33-35). In this paper, the proportion of subjects with abnormal MCL, abnormal MPD, and abnormal PMBL were 109 (26.20%), 70 (16.83%), and 252 (60.58%), respectively. Abnormalities in the menstrual cycle are seen in subjects with especially underweight, overweight, and obesity. Additionally, the majority of the samples included in the study are people living in the Mediterranean Region. Therefore, they have almost the same climatic conditions.

In this paper, the relation of the between menstrual characteristics and BMI was investigated. 307 subjects had normal cycle length and 71.33% of this was concentrated in people of normal weight. All eight of obese subjects had anormal menstrual cycle. Moreover, all eight of obese subjects had high duration of

the menstrual period. Two obese subjects had mild periodic menstrual blood loss, while six obese subjects had high PMBL. This is valuable in terms of showing us how obesity is effective in menstrual characteristics. If we look at the literature, body mass index plays a vital role in regulation of MCL (8,12). Conversely, in a study performed with Chinese females, BMI impacts positively PMBL, but is not associated with the MCL and BMI influences menstrual blood loss in females of reproductive age (10). According to literature, many factors may affect the menstrual cycle pattern. One of them is shift, circadian rhythm, impaired sleep-wake cycle (32,35). Moreover, menstrual cycle can be affected many factors including age, smoking, weight, exercise, race, life events, perceived stress, physiological situation, work environment, work shift, noise/ vibration (32,36). The default hypothesis is that stress may affect the menstrual cycle because of distruption on hypothalamic pituitary adrenal (HPA) axis. Females with high level stress may experience more irregular menstruation (32,37). Furthermore, mental health disorders are common among university students. Stress can prevent the release of some hormones including follicle-stimulating hormone or change progesterone synthesis. Also, progesterone or adrenaline, stress-related hormones are reported to affect prostaglandin synthesis and its binding in the myometrium (32,38). Subjects are faced with many stress resources like their education or daily life. Health students having psychological distress is common and tends to be reported more by female students with irregular periods (37). Long working and short rest duration causes to increase in the subjects' anxiety and dissatisfaction. It alters the menstrual characteristics (32,39-42).

In a study performed with Indonesia Female University students aged between 19-22 years, %47.22 of thirty-six subjects having menstrual cycle disorder was underweight, 30.56% of subjects were obese. Also, subjects with menstrual cycle disorder were dominated by underweight and followed by overweight, respectively (43). BMI has an impact on the menstrual cycle in that estrogen levels decrease or increase according to low and high levels in body fat which affects androgen, gonadotropin, luteinizing hormone, and follicle-stimulating hormone which affect menstruation (6,43). Menstruation is a complex process involving several hormones, reproductive organs, and the nervous system. If hormones are out of balance or any changes in the menstrual cycle, the cycle will be disrupted (8). In this paper, abnormality of MCL, MPD, and PMBL is associated with BMI. Also, especially underweight is more predictor parameter than obesity. Menstrual abnormalities were related to especially, underweight and overweight. In a study done with Nepal nursing students

researched the effect of BMI on menstrual characteristics, obesity had a directly proportional association with menstrual irregularity. BMI is a crucial parameter of menstrual characteristics in terms of MCL, MPD, and PMBL (4). Although it has been suggested that BMI may affect menstrual parameters, this effect of BMI on the menstrual cycle has not yet been fully understood (8). Haniarti et al's study evaluated the association of BMI and regularity of the subject's menstrual cycle with healthy females, and a relationship between BMI and the normal menstrual cycle in young females was found. Also, 43.3% of subjects experienced irregular menstrual cycles and 8.3% and 15% of subjects with irregular menstrual cycles were underweight and overweight, respectively (8).

Self-esteem plays a vital role in one's emotional well-being. Self-esteem is a positive manner to the self. This allows the subject to define how valuable he/she is. Self-esteem is a general sense of worth and goodness. Higher self-esteem means more self-worth, self-liking, self-approval, and self-respect (22-24,44,45). Rosenberg defines self-esteem as "one's positive or negative attitude toward oneself and one's evaluation of one's thoughts and feelings overall about oneself. Moreover, high adolescent self-esteem protects them against high-risk behavior and physical and mental problems (46). Subjects with higher weight or BMI are aware of their body size/volume. This situation is thought to be reflected in their behavior, self-confidence, and posture. For many years, self-esteem was accepted as a crucial determinant of health and quality of life (30). A study was done with University students to determine the association between self-esteem body image perception and BMI. A negative link was found between self-esteem and BMI, although there was no significance. Moreover, a significant negative correlation between body image dissatisfaction and self-esteem was found (30). Our study showed similar results to Pop's study. There is a negative correlation, but the relation is not significant. 89 subjects accepted as underweight's self-esteem score mean was 22.37 points, 271 subjects had normal weight took 22.15 from this scale followed by 22.02 points obtained from 48 subjects having overweight. The lowest score was obtained in 8 obese subjects. It can be said that the self-esteem scores of obese subjects were more affected than underweight subjects. The scores between 15 and 25 are accepted within the normal range. Although the value obtained in obese people compared to others is lower, it is not significant. This may be because our study population consisted of healthy individuals whose weight status was considered normal. For this reason, the self-esteem score obtained from the study group was normal.

In brief, the menstrual pattern can be affected by many factors such as age, race, genetics, smoking, physical activity, diet, and stress. The majority of our study group had normal weight, and there were no additional diseases. For this reason, both body mass indexes and self-esteem levels are accepted as normal. If menstruation characteristics and self-esteem are considered to be affected by heavy working conditions or long period working hours, the answer is given easily, why both menstruation and self-esteem levels can be considered normal in nursing students? Additionally, a review of the literature shows that weight control is essential for a female's menstrual cycle to continue in a healthy way (4,32,34). So, exercise, physical activity, and weight control can be suggested to subjects at risk in terms of weight.

It was observed that body mass index did not have a significant effect on self-esteem, it was noteworthy that the answers to the 5th, 8th, 9th, and 10th items in the self-esteem questionnaire were negative in the obese group (agree, and strongly agree). It was found that females with menstrual irregularity or abnormal menstrual characteristics including MCL, MPD, and PMBL are underweight, overweight, and obese. All of the obese subjects had menstrual irregularity. Also, body mass index plays an important role in menstrual cycle, duration, and blood loss, especially obesity. As we mentioned in the text, the menstrual cycle can be affected by many factors including age, weight, exercise, race, life events, perceived stress, physiological situation (cold), and work environment (work shift, noise/ vibration).

Ethical Approval: The study was conducted in conformity with the Helsinki Declaration principles. Necessary ethical board approvals and institution authorizations were obtained. This study which was descriptive and cross-sectional was approved by the Clinical Researches Ethics Committee (date:07.04.2023/ protocol number: 2023/132-32). All subjects were informed about the aim of the study, the voluntary nature of participation, and that they could withdraw from the study at any time.

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