

The Relationships Between Primary Dysmenorrhea with Body Mass Index and Nutritional Habits in Young Women

Abstract

Background: The menstrual cycle is a physiological process. However, many young and adult women can experience various physical and psychological complaints during their menstrual cycle. The most common and major gynecological complaint among women of reproductive age regarding their menstrual cycle is dysmenorrhea.

Aim: The aim of this study was to evaluate the relationship between primary dysmenorrhea with body mass index and nutritional habits in young women.

Methods: This was a cross-sectional study. This study was conducted at a university between May and December 2019. This study was carried out on 307 young women. Data were collected using an interview questionnaire, the visual analog scale, the dietary pattern index, and body mass index.

Results: The mean age of young women with primary dysmenorrhea was 20.84 ± 2.06 years. The prevalence of primary dysmenorrhea was 55.7%. The mean severity of menstrual pain was 7.16 ± 1.95 . The prevalence of primary dysmenorrhea was significantly correlated with age, age at menarche, body mass index, and dietary pattern index. It was determined that the prevalence of primary dysmenorrhea was 1.18 times higher among young women in the much elevated and elevated group according to the dietary pattern index compared to young women in the low- and moderate-risk groups. The prevalence of primary dysmenorrhea was also 1.06 times higher among young women who were overweight/obese according to body mass index compared to those who were underweight and normal.

Conclusion: Moderate positive correlations were detected between menstrual pain severity, body mass index, and dietary pattern index in young women with primary dysmenorrhea. Nurses must be sensitive to primary dysmenorrhea and address it by organizing education/counseling activities (symposiums).

Keywords: Body mass index, dietary habits, dysmenorrhea, women

Demet Aktaş¹, Didem Polat Külcü²,
Ebru Şahin³

¹Department of Midwifery, Çankırı Karatekin University, Faculty of Health Sciences, Çankırı, Türkiye

²Department of Nursing, Toros University, Faculty of Health Sciences, Mersin, Türkiye

³Department of Nursing, Ordu University, Faculty of Health Science, Ordu, Türkiye

Introduction

In women of reproductive age, certain changes in the reproductive organs occur on a monthly basis to continue reproductive functions during the period from menarche to menopause. These changes in the female reproductive organs are called the menstrual cycle.¹ The menstrual cycle is a physiological process. However, many young and adult women can experience various physical and psychological complaints during their menstrual cycle.² The most common and major gynecological complaint among women of reproductive age regarding their menstrual cycle is dysmenorrhea.³

Dysmenorrhea is defined as periodic painful menstruation, with pain occurring before or in the first days of menstruation. The pain generally starts as severe cramps in the subordinate abdomen and spreads to the inguinal area and buttocks.⁴ Severe pain in dysmenorrhea is frequently attended by headache, diarrhea, nausea and vomiting, and fluctuations in mood.⁵ The intensity of pain in dysmenorrhea varies among individuals. While some women experience mild pain, for others, it can be severe enough to impact their daily lives. Severe dysmenorrhea decreases women's labor productivity, quality of work, and academic performance and increases their accident risk.^{2,5}

Dysmenorrhea is assorted as primary or secondary.^{1,6-8} Primary dysmenorrhea (PD) is not associated with any underlying pathologic conditions and is considered typical menstrual pain.⁹ PD is common among women under 25 years of age starting 6-12 months

Cite this article as: Aktaş D, Polat Külcü D, Şahin E. The relationships between primary dysmenorrhea with body mass index and nutritional habits in young women. *J Educ Res Nurs*. 2023;20(2):143-149.

Corresponding author: Demet Aktaş
E-mail: demetaktas@karatekin.edu.tr

Received: May 25, 2021

Accepted: October 19, 2021

Publication Date: June 1, 2023



Copyright@Author(s) - Available online at
www.jer-nursing.org
Content of this journal is licensed under a
Creative Commons Attribution-NonCommercial
4.0 International License.

after menarche.^{5,9,10} In secondary dysmenorrhea, it is reported that there is an underlying constructional or pathological case (e.g., uterine fibroids and endometriosis) either inside or outside the uterus.^{2,11,12}

Dysmenorrhea is a very common complaint among young (~90%) and adult women (~60%). The global prevalence of dysmenorrhea is 60%-93%.^{1,4,5,9,10,13} The prevalence in Türkiye has been reported as 72%-89.5%.¹⁴⁻¹⁶ The etiology of PD is not well understood, although various risk factors have been identified.^{5,7,11} These risk factors count high body mass index (BMI), fatness, unstable diet (consuming less protein and vitamin-rich foods and more fatty foods), menarche prior to the age of 12, nulliparity, not being married, and family history.^{3,7,17,18} Many previous studies declared that BMI in the overweight/obese range may be related to dysmenorrhea. This is related to the fact that increased body weight and adipose tissue affect the balance of sex hormones, primarily estrogen and androgen, and can increase estrogen production. Higher estrogen and progesterone levels increase the rate of prostaglandin production. Increased prostaglandin release can cause PD.^{6,9,10,19} Many studies have disclosed a meaningful relationship between obesity and dysmenorrhea and indicated that the period of pain is twice as long in obese women compared to other women.^{3,5,7,8} However, some studies offer different evidence regarding the relationship between BMI and PD. These studies suggested that PD is more common among women who are underweight according to BMI.^{4,19}

Nutritional habits are another risk factor for PD that is of equal importance to BMI. Having balanced nutritional habits, a low-fat diet, and sufficient intake of protein, zinc, vitamins E and B, and magnesium are regarded as efficient methods of reducing dysmenorrhea.^{13,18,20} Various studies have indicated that the prevalence of PD is significantly lower among women who have a balanced diet, eat breakfast regularly, consume fish oil, and have a low-fat diet.^{13,21,22} In light of this information, determining the relationship between PD with BMI and nutritional habits in young women may lend substantially to lessening premenstrual issues. Therefore, the aim of the study was to appreciate the relationship between PD with BMI and nutritional habits in young women.

Materials and Methods

Sample and Study Design

In the present study, a cross-sectional design was used to gather information about the relationship between PD with the BMI and nutritional habits in the young women. The study was conducted with young women at a university between May and December 2019 in Türkiye. Those who have aches in the abdomen, groin, or waist areas the first 2 days before the menses period and/or on the first 3 days of menses were accepted as "with dysmenorrhea." The presence of dysmenorrhea that began and sustained with the emergence of the initial menstruation was described as "PD."¹⁶ The inclusion criterion were: (a) To become 18-30 years old, (b) to be willing to participate in the study, and (c) not to own any gynecological disease (e.g., polycystic ovarian diseases, abnormal uterine bleeding, and amenorrhea). The exclusion criteria were: (a) not to have pregnant and (b) not to own any communication problems, sensation problems, or mental disorders.

The sample size was identified based on previous studies carried out by Mohapatra et al⁶ and Rafique and Al-Sheikh (2018)⁵ and according to 1-way analysis of variance and power analysis to acquire a power of 0.95. The alpha level was adopted as 0.05 ($\alpha=0.05$). The size of the

sample was assigned as 307 women for this study. This study was carried out on 307 young women.

Data Collection Instruments

For data collection in the present study, we used a 29-item interview questionnaire, a visual analog scale (VAS), dietary pattern index (DPI), and BMI.

The interview questionnaire was structured by the researchers after investigation of the previous studies in the literature.^{4,11,13,17} It included the sociodemographic (age, marital status, and BMI), menstrual characteristics (age at menarche, duration of menses flow, and frequency of menses cycle), dysmenorrhea characteristics (pain with menstruation, family history, use of analgesics, and effects of dysmenorrhea on daily life), and nutritional habits (water consumption, cooking method, and fast-food eating frequency) of the young women.

For the aim of evaluating the dysmenorrheal pain severity, a VAS was utilized. It has been demonstrated that, compared with other one-dimensional scales such as oral description and numerical evaluation scales, the VAS is more delicate and dependable in the measurement of pain density. In this method, the women were educated to point out the severity of their pain on the 10 cm tabulated form. The beginning of the tabulated form is purported to be painless, and the ending of it is severe pain. Furthermore, the severity of dysmenorrheal pain in all women was measured 2 days before the beginning of menstrual period and in the initial 3 days of menstruation (5 days in total).

Furthermore, to determine the dietary pattern of the women, DPI was used, which was developed by Demirezen and Coşansu (Cronbach's alpha inner consistency level was determined to be 0.78).²³ DPI contains 6 items. All of the items were appraised on a 5-point Likert scale ("0=Never," "1=Seldom," "2=Occasionally," "3=Frequently," and "4=Every time"). The items in the scale can be listed as follows: "(1) I consume fatty and sugary foods, (2) I add salt to my food, (3) I consume more than 3 cups of coffee, cola, tea a day, (4) I eat beef, mutton, salami, sausage, soudjouk, (5) I eat out of menus such as hamburgers, french fries, pizza, (6) I eat meals dishes made with legumes such as lentils, dried beans, chickpeas, vegetable meals, and fruit. The least possible DPI total score is "0" scores, and the ultimate is "24." One of the items (6 item) is graded inversely. The DPI is commented as follows: A score of "0" is no risk; "1-6" slight risk; "7-12" moderate risk; "13-18" elevated risk, and; "19-24" much-elevated risk.²³ Furthermore, data on the dietary patterns of the participants for the past 3 months were collected in this study. The time set for this scale concurs with the results reported in the literature.¹⁸ In this study, the Cronbach's alpha coefficient was 0.91.

In addition, in determining BMI of women, a measuring rod was used for height (height measurements in standing position, without shoes, with the heels of the leg clinging, and the hips and back area of the series and shoulders along a straight line, against a meter attached to the wall with a precision of 0/5 cm) and the natural exhalation weighing (weighing with a SECa scale of Germany, with a minimum dress and no shoe with a precision of 0.1 kg), with a sensitivity of 0.1 kg, by researchers were gauged. Then, BMI (weightiness in kilograms divided by highness in meters squared) was computed.

Data Collection

The data were collected using a direct interview method by researchers. The researchers carried out the present study at the finish of a

class after obtaining permission from the instructors of the relevant department. Implementation of the descriptive form, scales, and anthropometric measurements continued for almost 20 minutes.

Ethical Considerations

Ethical approval was approved from the Toros University Ethics Committees (Approval Number: 80706068.02/E.9;2019/23, Date: 23.05.2019), and inscribed informed consents were acquired from the participants who agreed to participate in the study. Participants included in the study were enlightened about the aim and method of the study. The procedures to be used were explained to all participants. All of participants were explained that they could abandon the study at any time.

Data Analyses

Statistical analysis was done utilizing Statistical Package for the Social Sciences (SPSS) version 22.0 (SPSS version 22, IBM, New York, USA). Statistical tests including frequency, mean, chi-square, *t*-test, odds ratio, and Pearson correlation test were implemented.

Results

The prevalence of PD among the young women participating in the present study was 55.7%. The average age of young women with PD was 20.84 years (SD=2.06), their average height was 165.1 cm (SD=0.59), average body weight was 59.16 kg (SD=10.34), average BMI was 21.67 (SD=3.44), and average DPI was 13.90 (SD=3.54). The average age at menarche of young women was 12.36 (SD=1.32), and the average severity of menstrual pain was 7.16 (SD=1.95). In Table 1, it can be seen that the prevalence of PD was significantly correlated with age, age at menarche, BMI, and DPI ($P < .05$). In the present study, it was found that the prevalence of PD increases as the age and age of menarche of young women was decreased. Furthermore, it was found that the frequency of PD increases as the BMI and DPI scores was increased (Table 1).

Table 2 demonstrates the relationship between PD and some characteristics of the young women's menstrual cycle. Primary dysmenorrhea was found to be significantly more common among single young women compared to married young women ($P = .049$), among young women without a pregnancy history compared to those with a pregnancy history young women ($P = .029$), and among young women whose menstrual cycle lasted for 22-35 days compared to those whose cycle lasted for 21 days or less ($P = .024$). In addition, the prevalence of PD dysmenorrhea was higher among young women who had consulted a physician due to dysmenorrhea, used analgesics for dysmenorrhea, or owned a family history of dysmenorrhea ($P = .001$). Young women who stated that dysmenorrhea impacted their daily lives also had a higher prevalence of PD than young women who stated that dysmenorrhea did not impact their daily lives ($P = .001$). The prevalence of PD was not associated with variables such as being informed about menstruation, from whom they were informed about menstruation, the timing of being informed about menstruation, duration of menstrual flow (days), use of the oral contraceptive pill, duration of dysmenorrhea, time from menarche to dysmenorrhea onset, regular use of analgesics for dysmenorrhea, and timing of analgesic use for dysmenorrhea ($P > .05$).

The young women with PD included in the study reported that dysmenorrhea was frequently accompanied by symptoms such as irritability (74.9%), fatigue (67.4%), sleepiness (47.2%), headache (38.8%),

Table 1. Comparison of Anthropometric Indicators, BMI, DPI, and Some Characteristics of Young Women Who Had and Who Had Not Had Primary Dysmenorrhea (n=307)

Characteristics	PD	n (%)	Mean \pm SD	<i>t</i>	<i>P</i>
Age (years)	With PD	171 (55.7)	20.84 \pm 2.06	6.547	.011
	Without PD	136 (44.3)	21.85 \pm 3.78		
Height (cm)	With PD	171 (55.7)	165.11 \pm 0.59	.020	.888
	Without PD	136 (44.3)	164.43 \pm 0.58		
Weight (kg)	With PD	171 (55.7)	59.16 \pm 10.34	.456	.500
	Without PD	136 (44.3)	58.34 \pm 9.76		
BMI	With PD	171 (55.7)	21.67 \pm 3.44	.618	.003
	Without PD	136 (44.3)	20.97 \pm 3.18		
DPI	With PD	171 (55.7)	13.90 \pm 3.54	.352	.008
	Without PD	136 (44.3)	11.51 \pm 3.75		
Age at menarche (years)	With PD	171 (55.7)	12.36 \pm 1.32	2.340	.017
	Without PD	136 (44.3)	13.97 \pm 1.54		
Severity of menstrual pain	With PD	171 (55.7)	7.16 \pm 1.95	3.401	.359
	Without PD	136 (44.3)	4.47 \pm 2.20		

P < .05.
BMI, body mass index; DPI, dietary pattern index; PD, primary dysmenorrhea; *t*, independent 2-sample *t*-test.

nausea-vomiting (27.4%), diarrhea (24.1%), and edema (22.8%). Nonpharmacological implementation used by the women to cope with the symptoms they experience with dysmenorrhea included resting (84.4%), applying a hot compress (63.2%), taking a warm shower (34.5%), daydreaming (34.5%), massage (31.9%), and walking regularly (13.0%). However, it was determined that the other symptoms experienced by young women PD and the nonpharmacological methods they used to manage these symptoms did not affect the prevalence of PD ($P > .05$). In our evaluation of the relationships between nutritional habits and PD, we observed that variables such as amount of water intake, frequency of fast-food intake (per month), most preferred cooking method (fried, grilled, boiled), and most consumed food items (meat, milk, eggs, rice, crisps, etc.) were not associated with the prevalence of PD ($P > .05$).

The DPI scores of the women in this study were classified into 5 groups: Not risk, slight, moderate, elevated, and much elevated risks. Primary dysmenorrhea was more common among young women in the elevated (59.2%) and much elevated (54.2%) risk groups compared to those in the slight (46.1%) and moderate (52.2%)-risk groups, but the difference between the groups was not statistically significant ($P = .550$; Table 3). Body mass index values were also classified into 3 groups: underweight, normal, and overweight/obese. Young women with a BMI of 25 or higher were included in the same

Table 2. The Relationship between Primary Dysmenorrhea and Some Characteristics of the Young Women's Menstrual Cycle (n=307)

Some Characteristics	Primary Dysmenorrhea (PD)			X ²	P
	With PD n (%)	Without PD n (%)	Total n (%)		
Marital status					
Married	5 (38.4)	8 (61.6)	13 (100.0)	3.736	.049
Single	166 (56.1)	128 (43.9)	296 (100.0)		
Frequency of menstrual cycle (days)					
≤21	132 (55.5)	106 (44.5)	238 (100.0)	.494	.024
22-35	39 (56.5)	30 (43.5)	69 (100.0)		
History of pregnancy					
With pregnancy history	6 (46.1)	7 (53.9)	13 (100.0)	3.419	.029
Without pregnancy history	165 (56.1)	129 (43.9)	294 (100.0)		
Consult a physician					
Yes	59 (74.6)	20 (25.4)	79 (100.0)	16.06	.001
No	112 (49.1)	116 (50.9)	228 (100.0)		
Use of analgesics					
Yes	124 (68.9)	56 (31.1)	180 (100.0)	3.067	.001
No	47 (37.0)	80 (63.0)	127 (100.0)		
Family history of dysmenorrhea					
Yes	102 (67.5)	49 (32.5)	151 (100.0)	1.690	.001
No	69 (44.2)	87 (55.8)	156 (100.0)		
Impact on daily lives					
It was impacted	143 (74.1)	50 (25.9)	193 (100.0)	7.125	.001
It was not impacted	28 (24.6)	86 (75.4)	114 (100.0)		

X², chi-square test.

group (overweight/obese) due to the low number of participants in the obese category. Although the prevalence of PD was lower among underweight young women (53.1%) than normal (55.1%) and overweight/obese (61.3%) women, this difference was also nonsignificant ($P=.417$; Table 3). It was determined that the prevalence of PD was 1.18 times higher among young women in the elevated risk and much elevated risk groups according to DPI compared to young women in the slight and moderate-risk groups ($P = .027$; Table 4). The prevalence of PD was also 1.06 times higher among young women who were overweight/obese according to BMI compared to those who were underweight and normal ($P=.019$; Table 4).

Moderate positive correlations were detected between menstrual pain severity and BMI and DPI in young women with PD ($r = 0.585$,

Table 3. Subdimensional Outcomes of BMI and DPI in Young Women (n=307)

Characteristics	PD			X ²	P
	With PD n (%)	Without PD n (%)	Total n (%)		
DPI					
1-6 (slight risk)	6 (46.1)	7 (53.9)	13 (100.0)	2.108	.550
7-12 (moderate risk)	58 (52.2)	53 (47.8)	111 (100.0)		
13-18 (elevated risk)	90 (59.2)	62 (40.8)	152 (100.0)		
19-24 (much-elevated risk)	17 (54.8)	14 (45.2)	31 (100.0)		
BMI					
≤18.5 (underweight)	25 (53.1)	22 (46.9)	47 (100.0)	.987	.417
18.8-24.9 (normal)	119 (55.1)	97 (44.9)	216 (100.0)		
≥25.0 (overweight and obese)	27 (61.3)	17 (38.7)	44 (100.0)		

BMI, body mass index; DPI, dietary pattern index; PD, primary dysmenorrhea.

$P=.011$; $r = 0.457$, $P=.009$, respectively; Table 5). As BMI and risky nutritional habits increase in young women with PD, their menstrual pain increases in severity.

Discussion

This study investigated relationships between PD and BMI and nutritional habits in young women. The present study detected PD in more than half of young women (55.7%). Again, in other studies, it is found to be 89.2% in Greece,²¹ 84.1% in Italy,²⁴ 78% in Nigeria,²⁵ 45% in India,²⁶ 85.3% in Iran,¹ and 72.8% in China.¹¹ It is observed that amongst 72.7% and 85.7% in many studies carried out in Türkiye.^{16,27,28} A cause for the different results in these evaluations can be accounted for by the geographic differences (the sociocultural and ethnic factors) of the studies. Besides, these differences in the studies might result from the absence of objective appraisal methods employed to find out this situation of PD. Even so, the studies indicate that though there are different evaluation results, dysmenorrhea is a widespread gynecologic issue between young women.

In the literature, young women aged 20-25 years and women whose menarche occurred earlier than age 12 have been identified as having a higher risk of PD.²⁸ These periods in particular are characterized by anovulatory menstrual cycles (~60%) and insufficient progesterone release. Anovulatory menstrual cycles and insufficient progesterone release can trigger PD.^{1,16,27} In our study, the prevalence of PD was higher among women aged 20 and younger and women who were 12 years of age or younger at menarche ($P < .05$). The previous studies have also shown that the risk of PD rises with lower age and age at menarche.^{8,11,21} These results indicate that although age at menarche is influenced by factors such as genetic factors, socioeconomic factors, geographic region, bodily activity, and nutrition, it is a significant risk factor for PD.

Table 4. The Risk of Experiencing Primary Dysmenorrhea According to BMI and DPI of Young Women (n=307)

Characteristics	PD			X ²	P	OR
	With PD n (%)	Without PD n (%)	Toplam n (%)			
DPI						
1-12 (slight and moderate risk)	66 (54.1)	56 (45.9)	122 (100.0)	.472	.027	1.18
13-24 (elevated and much-elevated risk)	105 (56.7)	80 (43.3)	185 (100.0)			
BMI						
≤24.9 (underweight and normal)	144 (54.7)	119 (45.3)	263 (100.0)	.872	.019	1.06
≥25.0 (overweight and obese)	27 (61.3)	17 (38.7)	44 (100.0)			

BMI, body mass index; DPI, dietary pattern index; OR, odds ratio; PD, primary dysmenorrhea X², Pearson chi-square.

In the literature, the average severity of PD pain has been declared as 5.43-7.33.²⁹⁻³² In our study, the mean severity of PD was higher among the young women (7.16) ($P < .05$). Although pain intensity in the young women evaluated in this study is affected by different sociocultural, economic, and ethnic factors, our data were consistent with those from other studies performed in Türkiye and abroad.^{26,29,30,32} These results show that pain intensity in PD is moderate to high. Thus, pain management in PD is an important issue that must be addressed.

In this study, a statistical significance was detected between positive family history and PD ($P < .05$). The previous studies have shown that women who have a family history of PD have a 3-fold higher risk than women who do not.^{14,33} This phenomenon has been attributed to visual learning behavior between mother and daughter and pain perception.¹⁶ Moreover, genetic predisposition increases the risk of PD by 6 times.¹⁴ It has been shown that women who experience PD also have women in their family and close relatives (e.g., mother, sister, and aunt) who experience PD.^{22,29,33}

There was a statistical significance between the frequency of menstrual cycle and PD in the present study ($P < .05$). Early menarche age in women can increase the bleeding intensity and cycle length.²² Various studies indicated that the length of the menstrual cycle is a risk factor for PD.^{4,13} This was also reported in systematic reviews and meta-analyses on chronic pelvic pain.²¹ However, several other studies failed to demonstrate such a correlation.^{5,7,20,34} The cause for

this inconsistency in the literature is not known but may stem from differences in the sample sizes of the study groups or in the classification of cycle duration (e.g., cycle duration longer than 22 days) in studies about PD.

In our study, PD was found to be more common among single young women than married young women ($P < .05$). This is consistent with the literature data.^{4,19} PD in single women was shown to be influenced by psychological (stress) and sociocultural (negative perception of menstruation) factors.^{17,21,25} We also observed that the prevalence of PD was lower among women with a history of pregnancy than those without ($P < .05$). The previous studies showed that a history of pregnancy or live birth reduces the prevalence of PD.^{3,5,6} However, in some studies, it was reported that frequent births increased the prevalence of PD.^{7,11,12}

We also evaluated whether the participants in our study had consulted a physician or used analgesics for dysmenorrhea. It was found that the prevalence of dysmenorrhea was higher among the young women who had consulted a physician due to dysmenorrhea or used analgesics. Studies in Türkiye and other countries have shown that consulting a physician because of dysmenorrhea is not common among young women, that dysmenorrhea is considered a part of female life, and that analgesics are frequently used for pain management (54.6%-80%).^{14,16,17,25,35} These results suggest that women may need counseling activities regarding issues such as applying a physician, treatment, and nonpharmacological methods of managing dysmenorrhea.

Primary dysmenorrhea can impact women's daily lives. There was a statistically significant relationship in this study between PD and its effect on daily life ($P < .05$). Primary dysmenorrhea has been shown to decrease labor productivity (~41% cannot fulfill their daily obligations for approximately 2.8 days), quality of work, and academic performance, and increase accidents.^{6,13,30} The results of this study are coherent with the literature, indicating that PD adversely affects the daily lives of young women.

The literature includes various evidence regarding the effect of anthropometric indicators, including BMI, on PD. These studies have particularly emphasized obesity as a factor associated with PD among young women.^{6,18,22} This is related to the increased prostaglandin production in overweight and obese women. High prostaglandin level causes ischemia in the uterus and triggers myometrial

Table 5. The Correlation between Pain Intensity and BMI and DPI in Primary Dysmenorrhea

Variables	Menstrual Pain Severity	BMI	DPI
Menstrual pain severity	1	$r = 0.585$ P = .011	$r = 0.457$ P = .009
BMI	$r = 0.585$ P = .011	1	$r = 0.273$ $P = .056$
DPI	$r = 0.457$ P = .009	$r = 0.273$ $P = .056$	1

BMI, body mass index; DPI, dietary pattern index; r , Pearson correlation coefficient.

contractions, which in turn cause pain.^{5,17} In our study, the prevalence of PD was determined to be significantly higher among young women with a mean BMI of 21.67 (SD=3.44) than young women with a mean BMI of 20.97 (SD=3.18) ($P < .05$). When the young women in our study were classified by BMI as underweight/normal and overweight/obese, a statistically significant difference in the prevalence of PD was detected ($P < .05$). It was found that the risk of PD was 1.06-fold higher among young women in the overweight/obese group than the underweight/normal group. Studies by Ju et al.³ Rafique and Al-Sheikh (2018),⁵ Widayanti and Widawati,⁷ and Hu et al.¹¹ are also similar to our results, indicating a significant association between PD and high BMI. However, studies by Mohapatra et al.⁶ and Khodakarami et al.¹ found out that there is an exact relationship between PD and low BMI. Although conflicting data have been reported on the effect of BMI on PD, the results of our study suggest that BMI and obesity are important factors associated with PD among women.

The possible role of women's nutritional habits in relationship with the severity of PD and PD has been reported. Bajalan et al.¹³ reported the favorable effect of dietary habits rich in dairy products on controlling PD. Singh et al.⁹ included a weak relationship between protein-rich foods consumption (egg, cheese, and meat) and PD. Maruf et al.⁹ showed that an extreme consumption of vegetable, fruits, fish, and eggs had an affirmative relationship with the decrease of PD. A study in Türkiye reported that coffee, tea, coca cola, excessive fast food, fat and sugar-rich foods consumption, were an important risk factors of PD.¹⁸ Another a study by Bajalan et al., it was determined that, the rate of PD was found to be higher in adolescents who consumed coffee, tea, coke and excessive fast food.¹³ When evaluated according to DPI, we found that young women in the much elevated and elevated risk groups had a significantly higher prevalence of PD than young women in the slight and moderate-risk group ($P < .05$). Moreover, we determined that young women in much elevated and elevated risk groups based on DPI had a 1.18-fold higher risk of PD than young women with slight and moderate-risk groups. Our findings are similar to the results of other studies and indicate a relationship between nutritional habits and PD in which the prevalence of PD decreases with less risky nutritional habits.^{8,9,13,18}

There was a moderate positive correlation between menstrual pain intensity and the BMI and DPI of young women with PD. Higher BMI and riskier nutritional habits were associated with greater menstrual pain intensity in young women with PD. Numerous studies have reported similar results.^{5,10,18,19} These findings indicate the presence of a relationship between PD with BMI and nutritional habits.

Limitations of This Study

This study was carried out in a minor group. The outcomes of which were appraised according to the young women' statements. For this reason, the outcomes of the present study cannot be generalized. We carried out a cross-sectional study, the results of which were appraised according to the young women' statements. However, it is thought that it will be a source for prospective studies associated with PD.

Conclusion

In this study, we observed that PD is a common problem among young women. Age, menarche age, length of menstrual cycle length, history of pregnancy, consulting a physician, using analgesics for dysmenorrhea, family history of dysmenorrhea, and daily life were identified as

important factors in the development of PD. Moreover, young women in the much elevated and elevated risk groups according to DPI had 1.18 times more likely to have PD than young women in the slight and moderate-risk groups and young women who were overweight/obese according to BMI were 1.06 times more likely than young women who were underweight/normal. Intensity of menstrual pain was moderately positively correlated with BMI and DPI in young women with PD. Higher BMI and riskier nutritional habits were associated with greater menstrual pain intensity in young women with PD.

Clinical Implications

Primary dysmenorrhea is a common problem. Therefore, it is important that healthcare professional provide adolescent, young, and adult women training and counseling services about menstruation, managing dysmenorrhea, and the effects of BMI and nutritional habits on PD. In addition, school and public health nurses in particular must be sensitive to this issue and address it by organizing education/counseling activities (e.g., panels, symposiums, and sports activities).

Ethics Committee Approval: Ethical approval was approved from the Toros University Ethics Committees (Approval number: 80706068.02/E.9;2019 /23, Date: 23.05.2019).

Informed Consent: Informed consent was acquired from all personal participants implicated in the study.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – D.A., D.P.K., E.Ş.; Design – D.A., D.P.K., E.Ş., Supervision – D.A., D.P.K., E.Ş.; Materials – D.A., D.P.K., E.Ş., Resources – D.A., D.P.K., E.Ş, Data Analysis and/or Processing – D.A., D.P.K., E.Ş.; Analysis and/or Interpretation – D.A., D.P.K., E.Ş.; Literature Search – D.A., D.P.K., E.Ş.; Writing – D.A., D.P.K., E.Ş.; Critical Review – D.A., D.P.K., E.Ş.

Acknowledgments: The author acknowledges the participants who so willingly participated in this study.

Declaration of Interests: The authors have no conflict of interest to declare.

Funding: The authors declared that this study has received no financial support.

References

1. Khodakarami B, Masoumi SZ, Faradmal J. The severity of dysmenorrhea and its relationship with body mass index among female adolescents in Hamadan, Iran. *J Midwifery Women's Health*. 2015;3(4):444-450. [CrossRef]
2. Singh M, Rajoura OP, Honnakamble RA. Menstrual patterns and problems in association with body mass index among adolescent school girls. *J Fam Med Prim Care*. 2019;8(9):2855-2858. [CrossRef]
3. Ju H, Jones M, Mishra GD. A U-shaped relationship between body mass index and dysmenorrhea: a longitudinal study. *PLoS One*. 2015;10(7):e0134187. [CrossRef]
4. Çetin Ö, Aslan E. Common gynecological problems of adolescents. *J Adv Res*. 2019;2(1):36-43.
5. Rafique N, Al-Sheikh MH. Prevalence of primary dysmenorrhea and its relationship with body mass index. *J Obstet Gynaecol Res*. 2018;44(9):1773-1778. [CrossRef]
6. Mohapatra D, Mishra T, Behera M, Panda P. A study of relation between body mass index and dysmenorrhea and its impact on daily activities of medical students. *Asian J Pharm Clin Res*. 2016;9(9):297-299. [CrossRef]
7. Widayanti LP, Widawati PR. Correlation between body mass index and dysmenorrhea in preclinical female students aged 16-24 at the Hang Tuah university medical faculty, Surabaya. *J Health Psychol*. 2018;1(1):66-71.
8. Singh K, Srivastava D, Misra R. Relationship between primary dysmenorrhea and body composition parameters in young females. *In J Health Sci Res*. 2015;5(7):150-155. ISSN: 2249-9571.

9. Maruf FA, Ezenwafor NV, Moroof SO. Physical activity level and adiposity: are they associated with primary dysmenorrhea in school adolescents? *Aust J Rural Health*. 2013;17(4):167-174.
10. Potur DC, Kömürçü N. Complementary therapies for dysmenorrhea management. *Head*. 2013;10(1):8-13.
11. Hu Z, Tang L, Chen L, Kaminga AC, Xu H. Prevalence and risk factors associated with primary dysmenorrhea among Chinese female university students: a cross-sectional study. *J Pediatr Adolesc Gynecol*. 2020;33(1):15-22. [\[CrossRef\]](#)
12. Kızılırmak A, Kartal B, Calpbiniçi P. Prevalence of dysmenorrhea in young women and their coping methods. *Med Sci*. 2019;8(2):1-5. [\[CrossRef\]](#)
13. Bajalan Z, Alimoradi Z, Moafi F. Nutrition as a potential factor of primary dysmenorrhea: a systematic review of observational studies. *Gynecol Obstet Investig*. 2019;84(3):209-224. [\[CrossRef\]](#)
14. Yılmaz B, Şahin N. The prevalence of primary dysmenorrhea and menstrual attitudes of nursing students. *Mersin Univ J Health Sci*. 2019;12(3):426-438. [\[CrossRef\]](#)
15. Aktaş D, Şahin E, Gönenç İM. Some common gynecologic problems affecting women's health and nursing approaches. *Ank J Health Sci*. 2012;1(1):37-53.
16. Aktaş D. Prevalence and factors affecting dysmenorrhea in female university students: effect on general comfort level. *Pain Manag Nurs*. 2015;16(4):534-543. [\[CrossRef\]](#)
17. Rad M, Sabzevari MT, Rastaghi S. The relationship between anthropometric index and primary dysmenorrhea in female high school students. *J Edu Health Promot*. 2020;7(1):1-6. [\[CrossRef\]](#)
18. Kartal YA, Akyuz EY. The effect of diet on primary dysmenorrhea in university students: A randomized controlled clinical trial. *Pak J Med Sci*. 2018;34(6):1478-1482. [\[CrossRef\]](#)
19. Mohebbi Dehnavi Z, Rastaghi M, Torkamannejad Sabzevari M. A survey on the association of premenstrual syndrome with type of temperament in high school students. *Iran J Obstet Gynecol Infertil*. 2017;20(1):15-23.
20. Akduman AT, Budur OÇ. Treatment modalities in primary dysmenorrhea. *Anatolian Cli*. 2016;21(1):235-240.
21. Vlachou E, Owens DA, Lavdaniti M, et al. Prevalence, wellbeing, and symptoms of dysmenorrhea among university nursing students in Greece. *Diseases*. 2019;7(1):1-14. [\[CrossRef\]](#)
22. Monday I, Anthony P, Olunu E, et al. Prevalence and correlation between diet and dysmenorrhea among high school and college students in Saint Vincent and Grenadines. *Open Access Maced J Med Sci*. 2019;7(6):920-924. [\[CrossRef\]](#)
23. Demirezen E, Coşansu G. Evaluation of nutritional habits in adolescents. *STED*. 2005;14(1):174-178.
24. Grandi G, Ferrari S, Xholli A, et al. Prevalence of menstrual pain in young women: what is dysmenorrhea? *J Pain Res*. 2012;5(1):169-174. [\[CrossRef\]](#)
25. Adegbite AO, Omoloso B, Seriki SA. Prevalence of dysmenorrhea and menstrual bleeding in relation to packed cell volume among female students of Bingham University. *IJMMMS*. 2016;3(2):21-31.
26. Shah M, Monga A, Patel S. A study of prevalence of primary dysmenorrhea in young students-a cross-sectional study. *Indian J Community Med*. 2013;4(2):30.
27. Potur DC, Bilgin NC, Komurcu N. Prevalence of dysmenorrhea in university students in Turkey: effect on daily activities and evaluation of different pain management methods. *Pain Manag Nurs*. 2014;15(4):768-777. [\[CrossRef\]](#)
28. Seven M, Güvenç G, Akyüz A, Eski F. Evaluating dysmenorrhea in a sample of Turkish nursing students. *Pain Manag Nurs*. 2014;15(3):664-671. [\[CrossRef\]](#)
29. Orhan C, Çelenay ŞT, Demirtürk F, Özgül S, Üzelpasacı E, Akbayrak T. Effects of menstrual pain on the academic performance and participation in sports and social activities in Turkish university students with primary dysmenorrhea: A case control study. *J Obstet Gynaecol Res*. 2018;44(11):2101-2109. [\[CrossRef\]](#)
30. Wong CL, Ip WY, Lam LW. Self-care strategies among Chinese adolescent girls with dysmenorrhea: A qualitative study. *Pain Manag Nurs*. 2016;17(4):262-271. [\[CrossRef\]](#)
31. Yücel G, Kendirci M, Gül Ü. Menstrual characteristics and related problems in 9-18 year-old Turkish school girls. *J Pediatr Adolesc Gynecol*. 2018;31(4):350-355. [\[CrossRef\]](#)
32. Uysal G, Akkaya H, Cagli F. A comparison of two different oral contraceptives in patients with severe primary dysmenorrhoea. *J Pediatr Adolesc Gynecol*. 2018;38(6):828-832. [\[CrossRef\]](#)
33. Kural M, Noor NN, Pandit D, Joshi T, Patil A. Menstrual characteristics and prevalence of dysmenorrhea in college going girls. *J Family Med Prim Care*. 2015;4(3):426-431. [\[CrossRef\]](#)
34. Kilci Ş, Daşışkan Z, Muslu A. Complementary and integrative therapy practices on pain management in primary dysmenorrhea. *Atatürk Univ J Women Stu*. 2019;1(2):70-80.
35. Kırmızıgil B, Demiralp C. Effectiveness of functional exercises on pain and sleep quality in patients with primary dysmenorrhea: a randomized clinical trial. *Arch Gynecol Obstet*. 2020;302(1):153-163. [\[CrossRef\]](#)