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**THE PREVALENCE OF PREMENSTRUAL SYNDROME
AMONG MIDWIFERY STUDENTS AND ITS RELATIONSHIP
WITH LIFESTYLE**

PRISCILLA AMPOFOA OFEI
YÜKSEK LİSANS TEZİ

DANIŞMAN
Doç. Dr. Sündüz Özlem ALTINKAYA

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INDEX OF SYMBOLS AND ABBREVIATIONS

ACOG:	American College of Obstetricians and Gynaecologists
BMI:	Body mass index
DSM-IV:	The Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition
GnRH:	Gonadotropin-releasing hormone
ICM:	International Confederation of Midwives
PMDD:	Premenstrual dysphoric disorder
PMS:	Premenstrual syndrome
PMSS:	Premenstrual Syndrome Scale
SNRIs:	Serotonin-Norepinephrine Reuptake Inhibitors
SSRIs:	Selective Serotonin Reuptake Inhibitors

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ÖZET

EBELİK BÖLÜMÜ ÖĞRENCİLERİNDE PREMENSTRÜEL SENDROM GÖRÜLME SIKLIĞI VE YAŞAM TARZI İLE İLİŞKİSİ

**Ofei PA. Adnan Menderes Üniversitesi Sağlık Bilimleri Enstitüsü Ebelik Programı
Yüksek Lisans Tezi, Aydın, 2020.**

Bu araştırmanın amacı, Aydın Adnan Menderes Üniversitesi Sağlık Bilimleri Fakültesi Ebelik Bölümü öğrencilerinde premenstrüel sendrom (PMS) görülme sıklığını ve premenstrüel sendromun yaşam tarzı ile ilişkisini incelemektir.

Ebelik bölümünden 288 lisans öğrencisi (ruhsal bozukluğu olmayan/anti-depresan kullanmayan ve kombine oral kontraseptif kullanmayan) öğrenciler çalışmaya dâhil edildi. Katılımcıların antropometrik, sosyo-demografik, menstrüel ve yaşam tarzı özellikleri ile ilgili veriler veri toplama formu kullanılarak toplanırken, her katılımcıda PMS olup olmadığını belirlemek için premenstrüel sendrom ölçeği kullanılmıştır. PMS olan ve olmayan grupların karşılaştırmalarında Student t testi, Mann Whitney U testi, Pearson'un Ki-kare testi, Ki-kare testi, Fisher'in kesin sonuçlu olasılık testi; PMS için en fazla belirleyici olan bağımsız faktörlerinin belirlenmesinde ise çoklu değişkenli geriye dönük adımsal elemeli lojistik regresyon analizi kullanılmıştır.

Çalışmada katılımcılarının PMS prevalansı %51,3 olarak hesaplandı. Çoklu değişkenli lojistik regresyon analizine göre PMS gözlenen ve gözlenmeyen grupları ayırt etmede en fazla belirleyici olan pozitif ilişkili bağımsız faktörler fast-food tüketimi, adetle ilgili rahatsızlıkların sosyal hayata olan etkisi, vitamin/mineral desteği alma, gelir gider dengesinin bozuk olması, genelde stresli hissetme, uyku düzensizliği ve adet döneminde ağrı hissetme olarak tespit edilirken, beyaz et tüketimi PMS ile negatif ilişkili faktör olarak saptanmıştır.

Çalışmanın katılımcılarının önemli oranı PMS yaşamaktadır. Bu nedenle, sağlık hizmeti verenlerin konuya daha fazla dikkat etmesi, PMS ile ilgili konuların eğitim müfredatına dâhil edilmesi, sosyal destek ve daha sağlıklı yaşam tarzını daha tercih edilerek yaşam tarzı değişiklikleri önerilmektedir.

Anahtar: Premenstrüel sendrom, Premenstrüel sendrom ölçeği, Prevalans, Yaşam tarzı

ABSTRACT

THE PREVALENCE OF PREMENSTRUAL SYNDROME AMONG MIDWIFERY STUDENTS AND ITS RELATIONSHIP WITH LIFESTYLE

**Ofei PA. Aydın Adnan Menderes University Institute of Health Sciences Midwifery
Programme Master's Thesis, Aydın, 2020.**

This study was carried out with the aim of determining the prevalence of premenstrual syndrome (PMS) and its relationship with lifestyle among the midwifery students of the Faculty of Health Sciences of Aydın Adnan Menderes University.

288 undergraduate female students (who had no mental disorder/ used no anti-depressants and did not use combined oral contraceptives) in the Midwifery Department were recruited for the study. While data on the anthropometric, socio-demographic, menstrual and lifestyle characteristics of the participants were collected using data collection form, the premenstrual syndrome scale was utilised to determine the presence/absence of PMS in each participant. Student's t test, Mann Whitney U test, Pearson's Chi-square test, Chi-square test, Fisher's exact test and finally multiple logistic regression analysis via Backward LR procedure were employed in comparing the groups with and without PMS and determining the best predicting factors for PMS.

The prevalence of PMS among the study participants was found to be 51.3%. According to the result of multiple logistic regression analysis; whereas fast-food consumption, taking vitamin /mineral supplements, poor income and expense balance, generally feeling stressed, irregular sleep, feeling pain during menstruation and the effect of menstrual discomforts on social life were found to have a statistically significant positive relationship with PMS; consumption of white meat was found to be negatively related with PMS.

A significant proportion of the study's population suffer from PMS. Therefore, more attention from health care providers on the subject, the incorporation of PMS related topics into educational curricula, social support and lifestyle modifications to include healthier lifestyle choices are recommended.

Keywords: Lifestyle, Premenstrual syndrome, Premenstrual syndrome scale, Prevalence

1. INTRODUCTION

Women of child-bearing age all over the world experience menstruation which involves the desquamation of the endometrium approximately once in a month as a marker of their fertility. During their reproductive years, that is from menarche to menopause, a woman experiences about 400 menstrual cycles (Oral et al., 2014). Unfortunately, menstruation is accompanied by some discomforts and disorders in a majority of women. About 80% of women report symptoms related to the premenstrual period and a proportion of such women are eventually diagnosed with premenstrual syndrome (PMS) (O'Brien et al., 2014). PMS is defined as a constellation of somatic and psychological symptoms that manifest during the luteal phase (the period between ovulation and the start of menses) of the menstrual cycle, resolve with the onset of menstruation and interfere with an individual's life (O'Brien et al., 2014; WHO, 2019a).

PMS is truly a global health issue among women all over the world irrespective of their nationality, racial, religious, economic and educational status. In fact, Direkvand-Moghadam et al. (2014) indicates a global prevalence of PMS of 48% with individual national prevalence ranging from 12%-98%. In Turkey, an average prevalence of 50% has been reported as well (Direkvand-Moghadam et al., 2014). The wide range of reported prevalence is mainly due to the use of different tools of measurement/diagnosis in various studies as well as differences in age, nutrition, cultural and socio-economic background and physical activity (Direkvand-Moghadam et al., 2014). Taking this wide range and variations in diagnostic tools and population characteristics into consideration, more studies that are specific to populations are necessary so as to properly account for the specific characteristics of varying populations.

Having a prevalence of such a significant degree, PMS is not without its impact. PMS has been reported to be a risk factor for other diseases such as psychiatric morbidity (Cheng et al., 2013). Furthermore, possible absenteeism and low productivity due to PMS episodes has a significant negative impact on the economy (Sut and Mestogullari, 2015). Medical cost involved in the consultation, screening and treatment for PMS symptoms is believed to be a financial burden both on the individual and the financial budget of the government (Freeman, 2004). Moreover, the adverse effects of PMS in the social domain; on one's family and home life resulting in difficulties in finding a balance between work and home responsibility; and on academics causing poor performance, absenteeism and poor concentration have been well

established. (Pinar and Öncel 2011; Oral et al. 2012; Sut and Mestogullari 2015; Buddhabunyakan et al. 2017; Nworie et al. 2018; Victor et al. 2019)

Midwives have a very important role to play as far as PMS is concerned. They are responsible for taking detailed anamnesis, performing thorough physical examination for differential diagnosis and providing counselling and education on PMS (McCool and Durain, 2004; ICM, 2017; Karaçam and Eroğlu, 2019). In order for them to fulfil these duties midwives need to be well versed in knowledge related PMS particularly, the factors associated with it so that they are able to determine risk factors for individual patients and also provide adequate information.

Factors that have been consistently reported to be associated with PMS, most of which are lifestyle factors, include stress, dysmenorrhoea, poor nutritional habits, smoking, alcohol consumption, physical activity, poor quality of sleep, oral contraceptive use and caffeine consumption (Freeman, 2004; Seedhom et al., 2013; Arafa et al., 2018; Arafa et al., 2020). There is an expanding body of evidence of the association of PMS with lifestyle. Consequently, while treatment options such as Selective Serotonin Reuptake Inhibitors (SSRIs), oral contraceptives and Gonadotropin-releasing hormone (GnRH) agonists have been traditionally recommended for the management of PMS, the focus has recently gradually shifted from medical / surgical intervention to lifestyle modifications (Hofmeister et al., 2016; Malik R and Bhat MDA, 2018). A growing demand on the knowledge about which lifestyle factors are evidently related with PMS development and its occurrence as well as their mechanisms has led to the need for more studies that examine and confirm the potential relationship between PMS and lifestyle choices. In view of this, the present study was carried out with the aim of determining the prevalence of PMS and its relationship with lifestyle among the midwifery students of the Faculty of Health Sciences of Aydın Adnan Menderes University.

The present study seeks to answer the following questions;

1. What is the prevalence of PMS among the midwifery students of the Faculty of Health Sciences of Aydın Adnan Menderes University?
2. Among the midwifery students of the Faculty of Health Sciences of Aydın Adnan Menderes University, is there any relationship between PMS and lifestyle factors including smoking, alcohol use, physical activity, yoga/meditation, coffee consumption, tea consumption, salt intake, irritation, stress, contraceptive use, dietary supplement use, sleep pattern, water intake and pattern of nutrition (dairy products, red meat, white meat, seafood, fast food, sausages, bakeries/ pastries , desserts, carbonated drinks)?

2. GENERAL INFORMATION

Premenstrual syndrome is defined as a constellation of somatic and psychological symptoms that manifest during the luteal phase of the menstrual cycle, resolve with the onset of menstruation and interfere with an individual's life (O'Brien et al., 2014; WHO, 2019a).

Although the definition of this syndrome by various recognised institutions shows similarities, there is no universally accepted definition for PMS as yet, and these definitions present differing severity and diagnostic criteria for PMS. According to the International Statistical Classification of Diseases and Related Health Problems - 11th revision by the World Health Organisation, PMS is characterized by certain environmental, metabolic, or behavioural factors that occur during the luteal phase of the menstrual cycle, and leads to cyclic emotional, physical, or behavioural symptoms that interfere with an individual's lifestyle (WHO, 2019a). The American College of Obstetricians and Gynaecologists (ACOG) defines PMS as a cyclical condition in which a woman suffers at least one each of already defined affective and somatic symptoms that cause impairment in social, academic, or work performance. These symptoms must begin in the luteal phase and resolve with the onset of menstruation (Hofmeister et al. (2016) adapted from American College of Obstetricians and Gynecologists (2014)).

Throughout history and even today, the topic of menstruation and its related issues such as PMS has been considered a taboo in several societies. Nonetheless, PMS has always been in existence all these years although not acknowledged as such. Richardson (1995) makes reference to Hippocratic physicians inferring PMS when they reported '*a pathological condition of uterine gaseous distension where the accumulation of black bile in the uterus was manifested in headache, vertigo, melancholia, black urine, and vaginal discharge*'. Modern day theory of PMS was first reported by R.T. Frank in 1931 as 'premenstrual tension' with which he described a clinical condition of cyclical emotional discomforts which accompanied the second half of the menstrual cycle. Later, Greene and Dalton in 1953 proposed that the term 'premenstrual tension' be changed to 'premenstrual syndrome' since emotional tension was only a symptom among many other types of symptoms (Richardson, 1995).

PMS as used in this study refers to clinically significant PMS. A majority of women experience various symptoms, termed 'premenstrual symptoms' which are associated with the menstrual cycle. These symptoms may not necessarily interfere with the individual's quality of life. PMS, however, is distinguished from the normal psychological and somatic

premenstrual symptoms that women experience based on its negative effects on daily functioning and level of distress (O'Brien et al., 2014). A more severe form of PMS is premenstrual dysphoric disorder (PMDD). WHO (2019c) defines PMDD as a pattern of mood symptoms (depressed mood, irritability), somatic symptoms (lethargy, joint pain, overeating), or cognitive symptoms (concentration difficulties, forgetfulness) that begin several days before the onset of menses, start to improve within a few days after the onset of menses, and then become minimal or absent within approximately 1 week following the onset of menses in a majority of menstrual cycles within the past year. The symptoms are severe enough to cause significant distress or significant impairment in personal, family, social, educational, occupational or other important areas of functioning and do not represent the exacerbation of a mental disorder.

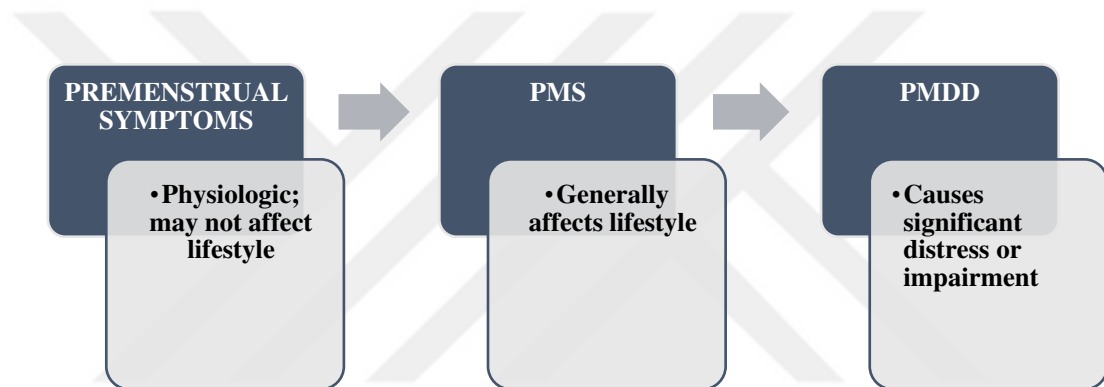


Figure 1. The relationship between premenstrual symptoms, PMS and PMDD

2.1. Epidemiology

PMS is experienced worldwide by women of reproductive age and its prevalence varies widely from country to country. Especially the use of different tools of measurement/diagnosis in various studies as well as differences in age, nutrition, cultural and socio-economic background and physical activity account for variations in the prevalence of PMS (Direkvand-Moghadam et al., 2014). The worldwide prevalence of PMS among menstruating women reported in the most recent meta-analysis is 48%. Reported prevalence ranges from 12% in France to 98% in Iran (Direkvand-Moghadam et al., 2014). The prevalence for Turkey reported in this study as 50% is consistent with what is reported by Pinar and Öncel, (2011) as 53.5% to be the prevalence among women between 15 and 49 years in Antalya, Turkey, using the Premenstrual Syndrome Scale. Sut and Mestogullari (2015); Doğan (2018); Yilmaz-Akyuz and Aydin-Kartal (2019); all in Turkey and using the

Premenstrual Syndrome Scale (PMSS), report prevalences of 38.1% among a population of nurses, 34.2% among students and 43.8% also among students respectively. Moreover, Tschudin et al. (2010) reported prevalence as low as 10.3% in Switzerland using the Premenstrual Syndrome Screening Tool. In Nigeria, prevalence was reported to be 47.6% using the Calendar of Premenstrual Experiences (Nworie et al., 2018).

2.2. Risk Factors of PMS

2.2.1. Risk Factors Related to Socio-Demographic Characteristics

2.2.1.1. Age

Pinar and Öncel (2011) as well as Abeje and Berhanu (2019) reported in their studies of women between ages 15-49 in Antalya-Turkey and of women in preparatory and secondary school respectively that age is an important predictor for PMS. Tschudin et al. (2010) revealed a higher prevalence of PMS among women of advanced reproductive age in his population-based study in Switzerland. On the contrary, Oraby et al. (2016) showed that PMS was more positively associated with younger age in their study.

2.2.1.2. Employment Status

Regarding employment status, Pinar and Öncel (2011) again report that PMS increased with unemployment and that PMS was associated with the type of profession a woman had.

2.2.1.3. Educational Status

It has been shown that PMS was more prevalent among women with lower educational status in some studies (Tschudin et al., 2010; Pinar and Öncel, 2011). However, Fernandez et al. (2019) reported that women with PMS had a higher educational status than women in the control group of the study.

2.2.1.4. Family Type

The association of PMS with family type was rarely reported in the various reviewed literature and in the case where it was evaluated, Pinar and Öncel (2011) report that it was not related to PMS.

2.2.1.5. Living Area

While a higher prevalence of PMS has been reported among women living in slums as compared to those living in urban areas in one study, another study reports that the residence of the participants had no statistically significant association with PMS (Pinar and Öncel, 2011; Oraby et al., 2016).

2.2.1.6. Marital Status

Whereas it is stated in one study that PMS was associated with marital status where it was more prevalent among single women, it is stated in another study that one's marital status had no significant effect on the occurrence of PMS (Tschudin et al., 2010; Pinar and Öncel, 2011).

2.2.1.7. Parity

Fernandez et al. (2019) revealed in their study that PMS was more likely in nulliparous women as compared to women who had given birth. Contrarily, in Pinar and Öncel (2011) study gravity and parity did not affect the occurrence of PMS.

2.2.1.8. Body Mass Index (BMI)

The subject of the association of BMI with PMS has been evaluated in several studies and differing results have been published. Bertone-Johnson et al. (2010) revealed from in their study of women aged 27-44 years without PMS at baseline over a ten-year-period during which some of these women developed PMS and some did not that; women with BMI ≥ 27.5 kg/m² were at a greater risk of developing PMS in comparison with women with BMI < 20 kg/m². Moreover, they found that 1 kg/m² increase in BMI raised the risk of PMS by 3%. Additionally, weight gain > 22 kg was positively correlated with the risk of PMS (77%) and women who experienced weight cycling over the ten-year-period were also at a higher risk of PMS (30%). A positive correlation between PMS and BMI has also been reported in another study of younger women in which the highest percentage of mild PMS and the lowest percentage of very severe PMS was recorded among women with normal BMI whereas the lowest percentage of mild PMS and the highest percentage of very severe PMS was recorded among women who were overweight (ELBanna et al., 2019). These findings implying a

strong significant positive association of BMI with PMS have been confirmed by other studies (Seedhom et al., 2013; Rad et al., 2018; Fernandez et al., 2019). However, other studies contradict these findings by reporting that there was no significant association of BMI with PMS. (Pinar and Öncel, 2011; Cheng et al., 2013; Hashim et al., 2019; Perry et al., 2015; Oraby et al., 2016)

Furthermore, a positive association between BMI and some specific physical symptoms of PMS including swelling of the extremities, backache, abdominal cramping, diarrhoea, constipation, and food cravings as well as some emotional symptoms including crying easily, mood swings and irritability has been reported (Bertone-Johnson et al., 2010).

2.2.1.9. Others

It has been reported that PMS was associated with heavy non-academic duties among students who were enrolled in secondary and preparatory schools (Abeje and Berhanu, 2019).

2.2.2. Risk Factors Related to Menstrual Characteristics

2.2.2.1. Age at Menarche

The reviewed literature report a significant association between PMS and early menarche which is defined as first menstruation before the age of twelve (Abeje and Berhanu, 2019; Fernandez et al., 2019; Kroll-Desrosiers et al., 2017). Furthermore, in their study which analysed the association between the age of menarche and some specific symptoms of PMS, Darabi et al. (2014) revealed that beyond the fact that the age of menarche was negatively associated with PMS on the whole, some of its symptoms including mood/emotional symptoms, pain and gastrointestinal symptoms were specifically negatively associated with the age of menarche as well.

2.2.2.2. Maternal/Family History of PMS

Oraby et al. (2016) as well as Rad et al. (2018) reported a correlation between PMS and family history. Furthermore, Seedhom et al. (2013) reported that PMS had an association with maternal history.

2.2.2.3. Length of Menstrual Cycle

The association of menstrual cycle interval with PMS is reported by one study (Oraby et al. 2016). Additionally, Abeje and Berhanu (2019) reported that women with a longer

menstrual cycle (> 35 days) had the highest risk for PMS compared to other categories. On the contrary, Arafa et al. (2018) stated that PMS was associated with shorter menstrual cycles. Menstrual irregularity was however not associated with PMS in the study conducted by Oraby et al. (2016).

2.2.2.4. Dysmenorrhoea

The relationship between PMS and dysmenorrhoea has been reported to be a strong one (Oraby et al. 2016). Arafa et al. (2018) revealed from their study that 88.1% of the women who experienced dysmenorrhoea had previously suffered from PMS while 81% of the women investigated were found to be both with PMS and dysmenorrhoea. Additionally, Yamamoto et al. (2009) indicated in their study that dysmenorrhoea was a predictive factor for premenstrual symptoms and vice versa.

2.2.2.5. Length of Menstrual Flow and Amount of Menstrual Flow

Oraby et al. (2016) reported that there was no significant relationship between the duration of menstrual flow and PMS as well as between the amount of menstrual flow and PMS. However, Yamamoto et al. (2009) reported that menstrual flow was a predictive factor for premenstrual symptom in their study.

2.2.3. Risk Factors Related to Lifestyle

2.2.3.1. Smoking (Cigarette)

Bertone-Johnson et al. (2008) in their longitudinal study reported that current smokers, former smokers, amount of cigarette smoked over a period of time and the duration of smoking were significant predictors for the development of PMS. Moreover, women who began smoking before turning 15 years old were at a higher risk for developing PMS. In the same study, in terms of specific symptoms of PMS, the subjects that smoked between the ages of 15 and 19 years had a significant higher risk for experiencing backache, acne and anger; and a lower risk for headache and insomnia. Similarly, current smokers had a significant higher risk for acne, breast tenderness and abdominal bloating compared to women who had never smoked.

Additionally, a significant positive relationship has been established in other studies that evaluated the relationship between PMS and smoking along with other hypothesised risk factors (Tschudin et al., 2010; Pinar and Öncel, 2011; Seedhom et al. 2013; Hashim et al., 2019). Nonetheless, Arafa et al. (2018) and Costanian et al. (2018) reported from their studies that there was no significant association between PMS and smoking.

2.2.3.2. Alcohol

Bertone-Jones et al. (2009) reported a general weak positive correlation between alcohol consumption and the development of PMS in their longitudinal study as well as a minimal risk increase, especially in lean women, for subjects who first used alcohol in adolescence. Additionally, whereas some studies reported positive association of PMS with alcohol use, some reported a null association between the two (Seedhom et al., 2013; Cheng et al., 2013; Costanian et al., 2018).

2.2.3.3. Physical Activity

According to one study in which aerobic exercises programme was administered to an intervention group for 8 weeks; three times a week and 20 minutes per session, it was found that compared to the control group, there was an improvement in some physical symptoms including headache, nausea, constipation, diarrhoea and swelling (Dehnavi et al., 2018). Moreover based on the longitudinal data of the intervention groups, symptoms such as bloating, vomiting, hot flashes and increased appetite reduced significantly in the same study.

Furthermore, in another study in which an aerobic exercise programme was administered to an intervention group for 12 weeks, total PMS scores besides visual analogue scale (VAS) scores significantly reduced implying that aerobic exercises had a positive impact on pain, which is a PMS symptom, as well (Yilmaz-Akyuz and Aydin-Kartal, 2019). In addition, Seedhom et al. (2013) reported that women who had a sedentary lifestyle were at a higher risk for PMS.

The association between PMS and physical activity seems to be an inconsistent one as contrarily, several other studies have reported a null association (Perry et al., 2015; Kroll-Desrosiers et al., 2017; Costanian et al., 2018; Arafa et al., 2018).

2.2.3.4. Yoga/Meditation

Munishwar and Mishra (2019) established in their critical review article that yoga aids in the alleviation of PMS symptoms by; releasing endorphins which is a natural mood-booster, soothing the central nervous system and improving the oxygenation of the reproductive organs, and relieving stress and deepening relaxation which in turn dulls the symptoms of PMS. Furthermore, in a 12-week yoga intervention that was carried out, it was observed that subjects with baseline moderate/severe PMS reported a significant improvement in abdominal swelling, breast tenderness, abdominal cramps, and cold sweats (Tsai, 2016).

2.2.3.5. Caffeine Consumption

A prospective study assessing the relationship between PMS and caffeine obtained from foods such as caffeinated coffee, decaffeinated coffee, caffeinated tea, herbal tea, other caffeinated beverages and other foods reported that there was no significant association between coffee consumption, even high levels, and PMS or its specific symptoms such as breast tenderness, irritability, and fatigue (Purdue-Smithe et al., 2016). Reported association between PMS and caffeine consumption is inconsistent as some other studies reported a positive correlation between PMS and caffeine consumption (Seedhom et al., 2013; Costanian et al. 2018; Abeje and Berhanu, 2019). A study even mentions a negative relationship between PMS and caffeine (Perry et al., 2015).

2.2.3.6. Salt Intake

Olson et al. (1996) indicated from their study that a 30% (115 mmol/d -73 mmol/d) decrease in dietary salt (sodium) did not yield any significant relief in the somatic symptoms of PMS.

2.2.3.7. Stress

Fernandez et al. (2019) reported a strong positive association between PMS and perceived stress. Additionally, Yamamoto et al. (2009) revealed from their study that stress score was a significant indicator for PMS.

2.2.3.8. Vitamins and Minerals

Calcium and vitamin D have been reported by several studies to significantly reduce the risk of PMS and its onset (Bertone-Jones et al, 2005; Kroll-Desrosiers et al., 2017). Chocano-Bedoya et al. (2012) also showed in their study that while high intakes of total (dietary/supplementary) non-heme iron was significantly negatively associated with PMS, total (dietary/supplementary) potassium was positively associated with it. There was no association between the total (dietary/supplementary) intakes of sodium, magnesium, and manganese; between dietary intakes of magnesium, zinc, manganese, copper, and sodium and PMS; and between supplementary intakes of minerals (iron, zinc, magnesium, copper, potassium, and manganese) and the development of PMS.

Furthermore, Chocano-Bedoya et al. (2011) reported again that whereas high dietary intakes of thiamine and riboflavin were inversely associated with the risk of PMS development, there was no relationship between PMS development and dietary intakes of niacin, vitamin B-6, folate, and vitamin B-12. Perry et al. (2015) reported a decrease in PMS symptoms in both majority and minority groups after taking fish oil supplements for 3 months.

2.2.3.9. Sleep

According to one study insomnia was related with some examined PMS symptoms; spasm, nervousness, fatigue, headache, breast pain, weight gain, and gastrointestinal disturbance (Arafa et al., 2020). Cheng et al. (2013) also reported that PMS was positively associated with low quality of sleep. Costanian et al. (2018) reported that the use of sleeping pills was more prevalent among subjects with PMS.

2.2.3.10. Nutrition

Darabi et al. (2014) reported from their study that dairy products were inversely associated with total PMS as well as some symptoms of PMS such as pain, acne, increased weight and polyuria. Furthermore, Bertone-Jones et al. (2005) also mentioned in their study that increased milk consumption particularly skimmed milk and low fat milk were related with a lower risk of developing PMS.

It has also been reported that PMS is strongly positively associated with high cholesterol levels, high calorie foods, sugary drinks/foods, fried foods, fast food (Seedhom et

al., 2013; Cheng et al., 2013; Rupa Vani et al., 2013; Selçuk et al., 2014; Rad et al., 2018; Hashim et al., 2019).

Hashim et al. (2019) stated in their study that fruits and non-starchy vegetable consumption, probably daily, was a preventive measure against physical, psychological and total PMS symptoms. Rad et al. (2018) as well mentioned a correlation between fruit consumptions and PMS.

Houghton et al. (2018) revealed in their prospective study that there was generally no association between PMS and total carbohydrates, glycaemic index and load, dietary insulin index, total sugar and sugar subtypes, total fibre and fibre subtypes, and whole and refined grains although maltose was found to be positively related to PMS development. Moreover, it was confirmed in another study that there was no association between PMS and complex carbohydrate (Hashim et al., 2019).

Houghton et al. (2019), in their nested prospective case-control study, reported a null-association between PMS risk and total protein, sources of protein (animal, vegetable, dairy), and specific amino acids (tryptophan, tyrosine, glutamate).

2.3. Aetiology

Despite its long dated history, PMS is still considered an idiopathic disease. The aetiology of PMS is barely understood. However, many studies have shown a strong association between the symptoms of PMS and the cyclic changes in oestrogen and progesterone levels (Hofmeister et al., 2016). It has also been shown that there is a requirement of ovarian activity and probably ovulation for the manifestation of premenstrual symptoms (O'Brien et al., 2014). Evidences of these theories include the non-existence of PMS symptoms before puberty, during pregnancy or after menopause, significant reduced or eliminated symptoms by bilateral oophorectomy, relief of symptoms with oral contraceptives, reoccurrence of both somatic and affective symptoms among postmenopausal women when they receive cyclical progestogen therapy and the reduction of PMS symptoms with the suppression of oestrogen by gonadotropin-releasing hormone analogues (Hofmeister et al., 2016; O'Brien et al., 2014; Nworie, 2018).

The effect of oestrogen and progesterone on serotonin, γ -aminobutyric acid and dopamine probably explains mood symptoms of PMS. These in turn could affect the renin-angiotensin-aldosterone system which could also be the reason for bloating and swelling that occur during the luteal phase (Hofmeister et al., 2016; Nworie, 2018). Although studies have

shown that there is no difference in progesterone/oestrogen levels between women with PMS and those who do not have it, why some women experience it and some do not is yet to be fully understood. The most probable explanation is that women with PMS are more sensitive to hormonal changes than the others (Nworie, 2018).

2.4. Symptoms

Numerous symptoms have been reported to be related with PMS. The large range and amount of reported symptoms may be attributed to the absence of a clear diagnosis for PMS and the possible presence of comorbidities and premenstrual exacerbation of other diseases (Freeman, 2004). Freeman et al. (2011), in an attempt to address this issue and hence identify core symptoms from among 17 PMS symptoms listed in a validated daily diary, concluded on anxiety/tension, mood swings, aches, appetite/food cravings, cramps, and decreased interest in activities to be core symptoms of PMS. Nworie et al. (2018) showed from their study that the most prevalent symptoms reported by the participants of her study were trouble concentrating, irritability, abdominal bloating, aches and pains, mood swings, breast tenderness, and food craving. Crying spells and insomnia were the least prevalent reported. Pinar and Öncel, (2011) also named headache, migraine, back joint and muscle pains, discomfort and pain in the abdomen, fatigue, atypical depressive characteristics, hostility / anger, anxiety, deterioration in social functionality as common symptoms in their study.

2.5. Diagnosis

In the diagnosis of PMS, it is essential for symptoms to occur during all or part of the 2-week luteal phase and resolve during or shortly after menstruation (O'Brien et al., 2014). It is also necessary that symptoms be not an exacerbation of an underlying disorder since certain ailments such as diabetes, migraine, epilepsy, asthma and depression or other mental disorders, although existent throughout the entire menstrual cycle, could intensify during the luteal phase (O'Brien et al., 2014; Hofmeister et al., 2016; Hsaio et al., 2004). In addition, attention should be paid to the possible presence of independent co-morbidity such as migraines, anaemia, endometriosis, hypothyroidism which exhibit symptoms similar to that of PMS. Removal of the ovarian cycle (e.g. with a GnRH agonist) to remove cyclical component, diagnostic laboratory testing or imaging should be used to rule out alternative medical diagnoses (O'Brien et al., 2014; Hofmeister et al., 2016).

Table 1 illustrates the diagnostic criteria for PMS as defined by ACOG. Based on ACOG's diagnostic criteria, if the patient reports at least one of the listed affective and somatic symptoms during the five days before menses in each of the three previous menstrual cycles, they have PMS (Hofmeister et al., 2016). According to the American Psychiatric Association, a patient must show at least 5 of 11 symptoms listed on the Diagnostic Criteria for Premenstrual Dysphoric Disorder according to the Diagnostic and Statistical Manual of Mental Disorders, Fourth Edition (DSM-IV) in order to meet the criteria for PMDD and the symptoms must be present in the final week before the onset of menses, start to improve within a few days after the onset of menses, and become minimal or absent in the week after menstruation. (Hofmeister et al. (2016), with attribution to the American Psychiatric Association (2013).

Among the various measurement tools for the symptoms of PMS, the Daily Record of Severity of Problems with which patients self-report symptoms has been found to be widespread and effective when used prospectively (O'Brien et al., 2014).

Table 1. Diagnostic Criteria for Premenstrual Syndrome

Premenstrual syndrome can be diagnosed if the patient reports at least one of the following affective and somatic symptoms during the five days before menses in each of the three previous menstrual cycles*	
Affective symptoms	Somatic symptoms
Angry outbursts	Abdominal bloating
Anxiety	Breast tenderness or swelling
Confusion	Headache
Depression	Joint or muscle pain
Irritability	Swelling of extremities
Social withdrawal	Weight gain

*—These symptoms must be relieved within four days of the onset of menses, without recurrence until at least day 13 of the cycle, and must be present in the absence of any pharmacologic therapy, hormone ingestion, or drug or alcohol use. The symptoms must occur reproducibly during two cycles of prospective recording. The patient must exhibit identifiable dysfunction in social, academic, or work performance.
Hofmeister et al. (2016) adapted from American College of Obstetricians and Gynecologists (2014)

2.6. Management

Available treatment options for PMS are to improve and relieve symptoms instead of curing it since there is no curative treatment for PMS as of yet (Hofmeister et al., 2016). PMS management may be grouped onto two main groups; pharmacologic management and non-pharmacologic management. Whereas pharmacologic treatment is usually preferred for severe PMS, non-pharmacologic treatment is usually opted for in cases mild and moderate cases.

2.6.1. Pharmacologic Management

- **SSRIs:** These are the first-line option of treatment for severe PMS. It may be administered continuously or intermittently during the luteal phase. Intermittent administration may be preferred since it is less expensive, has overall low rate of side effects, limits exposure to medications, may reduce tolerance and is more acceptable to many women (Malik and Bhat, 2018). It has been found effective especially for psychological symptoms and in high dosage, for physical symptoms. Nausea, asthenia, fatigue, and sexual dysfunction have been reported as adverse side effects. (Hofmeister et al., 2016)
- **Serotonin-Norepinephrine Reuptake Inhibitors (SNRIs):** This is a good option for patients with predominantly psychological symptoms. Adverse side effects include nausea, insomnia, and dizziness (Nworie, 2018).
- **Quetiapine (Seroquel®):** This is an antipsychotic adjunctive treatment with SSRI or SNRIs when the patient does not respond to SSRI or SNRI alone (Hofmeister et al., 2016).
- **Oral Contraceptives:** PMS has been associated with ovulation. Hence a suppression in ovulation with oral contraceptives to eliminate its related symptoms have been found to alleviate both physical and psychological symptoms (Malik R and Bhat MDA, 2018).
- **Gonadotropin-releasing hormone (GnRH) agonists:** GnRH agonists induce a temporary cessation of oestrogen/progesterone production which in turn relieves especially physical symptoms. However, prolonged use has been associated with menopause-like side effects. This advantage in addition to its costs has limited its use to situations when other medications have failed (Nworie, 2018).
- **Calcium supplements:** Although this mechanism is not fully understood, consistent cyclical changes in body calcium levels have been observed in women with PMS.

Continuous use of calcium supplements have been reported to help relieve symptoms of PMS (Bertone-Jones et al, 2005; Kroll-Desrosiers et al., 2017; Nworie, 2018).

- Vitamin and mineral supplements: Studies on vitamin and mineral supplements, for example vitamin D and magnesium, for the treatment of PMS are not conclusive. Daily administration of vitamin B₆ is however recommended for psychological symptoms (Chocano-Bedoya et al., 2012; Hofmeister et al., 2016; Nworie, 2018).

2.6.2. Non-pharmacological Management

- Herbal preparations and acupuncture: Although many various studies report the effectiveness of acupuncture and herbs such as saffron, St. John's wort, ginkgo, vitex agnus-castus, peppermint, angelica root, dragon's teeth, turmeric, tangerine, leaf, and bitter orange for PMS; there is no strong evidence to support their use (Hofmeister et al., 2016).
- Dietary modification: Seedhom et al. (2013); Cheng et al. (2013); Rupa Vani et al. (2013); Selçuk et al. (2014) Rad et al. (2018); Hashim et al. (2019); have reported an association of PMS with diet. Decreasing caffeine, sugar, alcohol intake can relieve anxiety and irritability; reducing sodium decreases oedema and bloating while consumption of fruits, vegetables, legumes, whole grain and water is also beneficial (Malik R and Bhat MDA, 2018).
- Exercise: Exercises are recommended since they have other health benefits apart from their positive effect on PMS (Nworie, 2018). Dehnavi et al (2018) also show the positive effect of aerobic exercises on some symptoms such as headache, nausea, constipation, diarrhoea, bloating, vomiting, hot flashes and increase in appetite.
- Yoga: Yoga exercise reduces harmful inflammatory secretions which make women with premenstrual syndrome comfortable (Munishwar and Mishra, 2019).
- Stress reduction: Sut and Mestogullari (2015) have shown from their study how stress can impact PMS. Its reduction could therefore, relieve PMS.

2.7. Coping Mechanisms

Coping mechanisms/strategies for PMS reported by previously conducted studies include the following; praying, meditation, music, massage, exercise, warm/cold shower, visit to hospital or pharmacy, herbal remedies, self-medication, planning, positive reframing,

acceptance, emotional/recreational activities, consultation with family members and friends and instrumental support (Buddhabunyakan et al., 2017; Nworie et al., 2018; Fernandez et al. 2019). Fernandez et al. (2019) ascribed dysfunctional coping strategies including denial, behavioural disengagement, venting, substance use and self-distraction to PMS episodes as well.

2.8. The Effect of PMS on Women's Life and Productivity

PMS is a significant condition considering its tremendous effect on women's life and productivity. Sut and Mestogullari (2015) report a negative correlation between PMS and work-related quality of life and productivity in nurses. Other studies have also shown the negative effect of PMS on mental health, relationships, general personality, presence at school, lack of concentration and motivation, as well as on academic performance (Pinar and Öncel, 2011; Nworie et al., 2018; Buddhabunyakan et al., 2017). In a study to determine the quality of life among university students with PMS, Victor et al. (2019) reported a significant decrease in the quality of life in all domains that is; physical, mental, social relationships and environmental. Dennerstein et al. (2010) report in their study examining the effect of PMS on the activities of daily life among women selected from 8 countries in 2 continents that 64.6% women were not or very slightly affected, 24% women were moderately affected, and 11.1% were severely affected by PMS in the performance of activities of daily life. Furthermore, they found that all the symptoms of PMS analysed in the study had a significant effect on the activities of daily life and that both physical and emotional symptoms had equal impact.

2.9. Midwifery and PMS

The International Confederation of Midwives (ICM) outlines health counselling and education for the woman, family and the community on the topics of antenatal care, preparation for parenthood, women's health, sexual or reproductive health and child care as an important task of the midwife (ICM, 2017). In Turkey, midwives work in hospitals, family health centres and other health institutions where taking anamnesis, performing physical examination, administering treatment and providing health counselling are important aspects of their profession (Karaçam and Eroğlu, 2019). Being a topic related to reproductive health, midwives have a very important role to play as far as PMS is concerned. Firstly, it is imperative for midwives to take detailed and quality anamnesis of patients including family

history, timing of symptoms and others and in doing so, detect PMS risk where the complaint is not about PMS and make necessary referrals (McCool and Durain, 2004). Performing a thorough physical examination helps to rule out comorbidities and sources of premenstrual exacerbations such as hypothyroidism and major depressive disorder (McCool and Durain, 2004). Additionally, midwives play a very important role by providing detailed education and counselling about PMS where the need arises – for instance at health seminars at schools, during patient discharge, etc. Taking these into account, the midwife should be abreast of evidence-based and current knowledge on PMS in every way (Karaçam and Eroğlu, 2019).



3. METHODOLOGY

3.1. Type of Research

This research was an analytic and cross-sectional study conducted with the aim of determining the prevalence of PMS and its relationship with lifestyle among the midwifery students of the Faculty of Health Sciences of Aydın Adnan Menderes University.

3.2. Date and Location of Research

The research was carried out between 01st August, 2019 and 30th June, 2020, at Aydın Adnan Menderes University, located within the Province of Aydın (Turkey), specifically, the Midwifery Department. The Midwifery Department which is under the Faculty of Health Sciences offers a four-year degree programme in midwifery, hence, four major levels (classes) are found in this department; the first year class, second year class, third year class and the fourth year class. As midwifery is traditionally regarded as a females' profession, it is not surprising that the student body totally consists of females except a very few males.

3.3. Population and Sample of Research

The population of the research comprised 377 undergraduate female students in the Midwifery Department of Aydın Adnan Menderes University who had been registered for the 2019/2020 academic year.

The minimum number of students considered appropriate as the sample size was determined based on a previously reported study. Selçuk et al. (2014) reported a PMS prevalence of 50.2% in their study titled 'The Prevalence of Premenstrual Syndrome among Nursing Students and Affecting Factors'. According to the known population sampling method, based on the reported prevalence of 50.2% and with 95% confidence interval ($\alpha = 0.05$) $p = 0.05$, $t = 1.96$ and $N = 377$; the minimum number of students required was calculated to be 204.

n: sample size

N: population size

$$\frac{Nt^2 \sigma^2}{d^2(N-1)+t^2 \sigma^2}$$

$$\frac{377 \times (1,96 \times 1,96) \times (0,502 \times 0,498)}{(0,05 \times 0,05) \times 376 + (1,96 \times 1,96) \times (0,404 \times 0,596)}$$

$$\frac{377 \times 3,8416 \times 0,250}{0,0025 \times 376 + 3,8416 \times 0,250}$$

$$\frac{362,071}{0,94 + 0,960}$$

$$\frac{350,573}{1,9}$$

n = 184,512
n = 185 + %10
n = 204

However, in order to increase the strength of the study, the entire population of the study, which was the 377 undergraduate female students in the Midwifery Department, was included in the study.

3.4. Inclusion and Exclusion Criteria of Research

3.4.1. Inclusion Criteria

The inclusion criteria for this research is as listed below:

- Volunteering to participate in the research
- Studying at the Midwifery Department of Aydın Adnan Menderes University Faculty of Health Sciences
- Being a female

3.4.2. Exclusion Criteria

The exclusion criteria for this research is as listed below:

- Having any mental disorder/ using anti-depressants
- Using oral combined contraceptives
- Being a male student
- Having Turkish speaking and reading problems

- Failure to fully complete the questionnaires

3.6. Data Collection Tools

For the collection of data for the research, 2 forms were used. These were the data collection form (Annex 1) and the PMSS (Annex 2) developed by Başaran Gençdoğan (Gençdoğan, 2006).

3.6.1. Data Collection Form

Prepared by the researchers in the light of related literature, this form consists of 36 questions under 3 major categories; socio-demographic and anthropometric characteristics (Questions 1-10; age, height, weight, class, employment status, income level, health insurance, family type, living area and marital status), menstrual characteristics (Questions 11-16 age at menarche, length of menstrual cycle, length of menstrual flow, regularity of menstruation, menstrual pain, use of painkillers) and characteristics that may be associated with PMS (Questions 17-36 smoking, alcohol use, physical activity, yoga/meditation, coffee consumption, tea consumption, salt intake, irritation, stress, diseases/medication, contraceptive use, dietary supplement use, sleep pattern, water intake and pattern of nutrition (dairy products, red meat, white meat, seafood, fast food, sausages, bakeries / pastries, desserts, carbonated drinks) (Doğan, 2018; del Mar Ferna'ndez et al., 2019). Additionally the specific area(s) of life – academic, social, professional, family/domestic, which were usually interfered by the symptoms of PMS were inquired.

3.6.2. The Premenstrual Syndrome Scale (PMSS)

The PMSS is a 44-item 5-point Likert type scale developed by Başaran Gençdoğan that measures the severity of premenstrual symptoms. The PMSS consists of items/statements describing the symptoms of PMS under 9 main sub-sections; firstly depressive feelings, then anxiety, fatigue, nervousness, depressive thoughts, pain, changes in appetite, changes in sleep pattern and lastly bloating.

As indicated on the top of the form, the subject, after carefully reading the descriptive statement, marks the option 'never', 'seldom', 'frequently', or 'always' depending on which option best describes their experience in the week before their menstruation begins. When scoring an item, the 'never' option is scored with 1 point, 'seldom' option is scored with 2

points, 'sometimes' option is scored with 3 points, 'frequently' option is scored with 4 points and the 'always' option is scored with 5 points. The total PMSS score is obtained by adding up the sum-scores of each sub-section. The minimum total score that may be obtained from this scale is 44 points whereas the maximum total score is 220 points. A total score of 132 points (50%) and above indicates the presence of PMS. For a more detailed diagnosis: a score of 44 points indicates the absence of PMS; a score of 45-103 points, mild PMS; a score of 104-163 points, moderate PMS; and a score of 164-220 points, severe PMS.

In the process of developing the scale, the Cronbach Alpha coefficient was calculated to be 0.76 (Gençdoğan, 2006). In another study, the Cronbach Alpha coefficient was calculated 0.966 Doğan (2018). Considering the successful utilisation of this scale in the diagnosis of PMS by other studies, this scale was chosen for this research (Selçuk et al., 2014; Sut and Mestogullari, 2015; Yilmaz-Akyuz and Aydin-Kartal, 2019). Permission to use the scale was requested and granted by the author through electronic mailing (Annex 3).

3.7. Collection of Data

The data for this research was collected between 18th and 20th December, 2019. Before a compulsory lecture for each of the 4 classes, which all the students of the class were expected to attend, permission was sought from the facilitator of the lecture. With the facilitator's permission, both the data collection form and the PMSS forms were distributed and completed during the first or last 15 minutes of the lecture. The students were reminded that participation in the research was completely by volition. Moreover, they were encouraged to completely fill the form as incomplete forms would be considered invalid and hence excluded for the research. Whether each form had been completely filled was ensured when the students submitted their forms.

3.8. Dependent and Independent Variables

The dependent variable of this research is the PMSS score. The independent variables on the other hand are; age, BMI, class, employment status, income level, health insurance, family type, living area, marital status, age at menarche, menstrual cycle interval, duration of menstrual flow, regularity of menstruation, dysmenorrhoea, use of painkillers, family history of PMS, smoking, alcohol use, physical activity, yoga/meditation, caffeine consumption, salt intake, irritation, stress, diseases/medication, contraceptive use, dietary supplement use, sleep

pattern, water intake and pattern of nutrition (dairy products, red meat, /white meat, seafood, fast food, sausages, bakeries / pastries , desserts, carbonated drinks)

3.9. Analysis of Data

In total, 237 students participated in the research through their filling of the forms. Students who did not complete their forms as well as the few students who were on oral contraceptives and anti-depressants were excluded from the research. Consequently, the data of 228 students were eventually analysed.

Data analysis was performed by using IBM SPSS Statistics version 18.0 software (IBM Corporation, Armonk, NY, USA). Whether the continuous variables were normally distributed or not was determined using Kolmogorov-Smirnov test. The assumption of homogeneity of variances was examined by Levene's test. Descriptive statistics for continuous variables were expressed as mean $\pm$ SD or median (min-max), where appropriate. Number of cases and percentages were used for both nominal and ordinal data.

While the mean differences between groups were compared using Student's t test, Mann Whitney U test was applied for comparisons of both ordinal and the continuous variables for which the parametrical test assumptions were not met. Pearson's Chi-square test was used in the analysis of categorical data unless otherwise stated. On the other hand in all 2 x 2 contingency tables to compare categorical variables; the Continuity corrected Chi-square test was used when one or more of the cells had an expected frequency of 5-25, otherwise, the Fisher's exact test was used when one or more of the cells had an expected frequency of 5 or less.

Multiple logistic regression analysis via Backward LR procedure was performed to determine the best predicting factor(s) for PMS. Any variable whose univariate test had a p value <0.10 was accepted as a candidate for the multivariable model along with all variables of known clinical importance. Odds ratios, 95% confidence intervals and Wald statistics for each independent variable were also calculated. A p value less than 0.05 was considered as statistically significant.

3.10. Ethics

Written permission (Annex 4) was obtained from the Faculty of Health Sciences, Aydın Adnan Menderes University for the implementation of the research. The research protocol

(Annex 5) was approved by the Ethics Committee of the Faculty of Health Sciences Clinical Research Advisory Commission. Verbal and written consent (included in the data collection form) about the purpose of the research, the time required to fill in the questionnaire and the scale, the participation in the research being voluntary, right to withdraw from the research at any point, and the confidentiality of the personal information provided was obtained from the students who participated in the study.



4. RESULTS

In this section, the results of statistical analyses performed for the data 228 midwifery students in the faculty of Health Sciences at Aydın Adnan Menderes University are presented.

4.1. Results for Socio-demographic Characteristics

Descriptive statistics on the socio-demographic characteristics of the participants included in the research are shown in Table 2. The average age of the participants was 20.1 ± 1.3 years and the average BMI was $22.2 \pm 4.24 \text{ kg/m}^2$. Out of the total number of participants, 65 (28.5%) participants were in their first year, 58 (25.4%) in their second year, 61 (26.8%) in their third year, and 44 (19.3%) in their fourth year. Of the 228 participants, 8 (3.5%) were employed. While 18 (7.9%) participants reported family income exceeding their expenditure, 88 (38.6%) reported family income equalling their expenditure and 122 (53.5%) reported family expenditure exceeding their income. The percentage of students from nuclear, extended and broken homes were found to be 206 (90.4%), 19 (8.3%) and 3 (1.3%), respectively. Whereas 91 (39.9%) participants had lived in urban areas the longest, 78 (34.2%) and 59 (25.9%) had lived in suburban and rural areas the longest respectively. Most of the participants were single (98.2%); only 4 (1.8%) were married.

Table 2. Socio-Demographic Characteristics of the Participants of the Study

Characteristic (n=228)	mean $\pm$ SD
Age (years)	20.1 $\pm$ 1.3
Body weight (kg)	59.0 $\pm$ 10.9
Height (m)	1.63 $\pm$ 0.063
Body mass index (kg / m ²)	22.2 $\pm$ 4.24
Characteristic (n=228)	n (%)
Class	
1 st year	65 (28.5%)
2 nd year	58 (25.4%)
3 rd year	61 (26.8%)
4 th year	44 (19.3%)

Table 2. Socio-Demographic Characteristics of the Participants Included in the Study (continued)

Characteristic (n=228)	n (%)
Employment status	8 (3.5%)
Income level of family	
Income > expenditure	18 (7.9%)
Income = expenditure	88 (38.6%)
Income < expenditure	122 (53.5%)
Having health insurance	182 (79.8%)
Family type	
Nuclear	206 (90.4%)
Extended	19 (8.3%)
Broken	3 (1.3%)
Living area (where the participant has lived longest)	
Urban	91 (39.9%)
Suburban	78 (34.2%)
Rural	59 (25.9%)
Marital status	
Married	4 (1.8%)
Single	224 (98.2%)

4.2. Results for Menstrual Characteristics

Descriptive statistics on the menstrual characteristics of the participants included in the research are shown in Table 3. The average age at menarche, length of cycle and length of flow were determined to be 13 years, 28 days and 6 days, respectively. While 85.5% of the participants had a regular menstrual cycle, only 14.5% had an irregular cycle. Whereas 73.7% of the participants experienced menstrual pain, 26.3% did not. However, 39.5% of the participants used analgesics for menstrual pain; the remaining 60.5% did not.

Table 3. Menstrual Characteristics of the Participants Included in the Study

Characteristic (n=228)	median (min– max)
Age at menarche (years)	13 (10-15)
Length of cycle (days)	28 (18-50)
Length of flow (days)	6 (2-8)
Characteristic (n=228)	n (%)
Regular cycle	
Yes	195 (85.5%)
No	33 (14.5%)
Menstrual pain	
Yes	168 (73.7%)
No	60 (26.3%)
Use of analgesics for Menstrual Pain	
Yes	90 (39.5%)
No	138 (60.5%)

4.3. Results for the Characteristics Related to the Risk Factors of PMS

Table 4 shows the descriptive statistics of the participants of the study in terms of the risk factors related to PMS. While 81.6% were non-smokers, only 18.4% of the participants had been smoking and the average number of cigarettes smoked per was 7. Most of the participants were not alcohol users (82.9%); the remaining 17.1% that used alcohol once a week on the average. Whereas 25.9% of the participants were involved in physical activities 4 times per week on the average, only 3.1% practised yoga/meditation once a week on the average. The mean rates of coffee and tea consumption among the participants were determined to be 1 and 2 cups per day, respectively. A considerable amount of 26.8% added extra salt to their food before tasting it. The participant's average daily intake of water was calculated to 1.4lt with 10.1% of the source being the mains water system, 69.7% being commercially sold water, 8.3% being mineral water and 24.1% being water obtained from purification devices.

Out of the total number of participants, 50.4% reported premenstrual complaint in mother or sister, 89.0% experience moments when they are unable control their anger and it is generally before and during menstruation (68.5% and 22.6% respectively) although a few

experience this every time regardless of the menstrual cycle phase. A reasonable percentage of the participants (65.8%) reported feeling stressed generally. In terms of which area of life was affected by any menstrual discomfort; 47.4%, 69.3%, 11.4% and 28.9% were affected in their academic, social, professional and family/home lives, respectively. Additionally, 7.5% suffered from chronic illnesses, 5.7% were on constant medication, only 2.6% used contraceptives, and 13.6% were on vitamin and/or mineral supplements. While 46.9% had a regular sleep pattern, 53.1% did not.

Table 4. Risk factors related to PMS of the participants of the study

Characteristic (n=228)	n (%)
Currently smoking	
No	186 (81.6%)
Yes	42 (18.4%)
Alcohol use	
No	189 (82.9%)
Yes	39 (17.1%)
Physical activities	
No	169 (74.1%)
Yes	59 (25.9%)
Yoga / Meditation	
No	221 (96.9%)
Yes	7 (3.1%)
Characteristic	median(min-max)
Frequency of smoking (pieces / day)	7 (1-20)
Frequency of physical exercise (times / week)	4 (1-7)
Frequency of alcohol consumption (times/week)	1(1-7)
Frequency of yoga/meditation (times / week)	1 (1-4)
Coffee consumption (cups / day)	1 (0-6)
Tea consumption (cups / day)	2 (0-10)
Frequency of water intake (glasses (200ml) / day)	7 (2-16)

Table 4. Risk factors related to PMS of the participants of the study (continued)

Characteristic (n=228)	n (%)
Adding extra salt before tasting	
Yes	61 (26.8%)
No	167 (73.2%)
Type of drinking water	
Mains water	23 (10.1%)
Commercially sold water	159 (69.7%)
Mineral water	19 (8.3%)
Water obtained by purification device	55 (24.1%)
Premenstrual complaint in mother or sister	
Yes	115 (50.4%)
No	113 (49.6%)
Inability to control anger sometimes	
Yes	203 (89.0%)
No	25 (11.0%)
When anger is especially uncontrollable	
Before menstruation	139 (68.5%)
During menstruation	46 (22.6%)
Always	18 (8.9%)
Generally feeling stressed	
Yes	150 (65.8%)
No	78 (34.2%)
Areas affected by menstrual discomforts	
Academic	108 (47.4%)
Social	158 (69.3%)
Professional	26 (11.4%)
Family / home life	66 (28.9%)
Presence of chronic disease	17 (7.5%)
Constant medication	13 (5.7%)

Table 4. Risk factors related to PMS of the participants included in the study (continued)

Characteristic	n (%)
Use of contraceptive method	6 (2.6%)
Vitamin / mineral supplement	31 (13.6%)
Sleep pattern	
Regular sleep	107 (46.9%)
Irregular sleep	121 (53.1%)

4.4. Results for Chronic Diseases, Constant Medication, Contraceptive Methods and Vitamin/Mineral Supplement

Table 5. Frequency distribution of the participants in terms of chronic diseases, constant medication, contraceptive method and vitamin/mineral supplement

Distribution of participants	n	%
Presence of chronic disease		
Migraine	5	2.2
Thyroid dysfunction	3	1.3
Allergic asthma	3	1.3
Hypertension	2	0.9
Atrial Septal Defect	1	0.4
Familial Mediterranean Fever	1	0.4
Immune thrombocytopenic purpura	1	0.4
Vertigo	1	0.4
Constant medication		
Anti-anaemic	5	2.2
Thyroid medication	3	1.3
Anti-hypertensive	2	0.9
Migraine medicine	2	0.9
Anti-asthmatics	1	0.4
Use of contraceptive method		
Condom	6	2.6

Table 5. Frequency distribution of the participants in terms of chronic diseases, constant medication, contraceptive method and vitamin/mineral supplement (**n=228**) (continued)

Vitamin / mineral supplement	n	%
Vitamin	26	11.4
Calcium - vitamin D	3	1.3
Zinc	1	0.4
Magnesium	1	0.4

Frequency distribution of the participants in terms of chronic diseases, constant medication, contraceptive method and vitamin/mineral supplement is presented in table 5. A very small percentage of the participants reported living with the following chronic diseases; migraine, thyroid dysfunction, allergic asthma, hypertension atrial septal defect, familial Mediterranean fever, immune thrombocytopenic purpura and vertigo. Moreover, another small percentage of the participants were constantly using anti-anaemic, anti-hypertensive, anti-asthmatic, thyroid and migraine drugs. With combined oral contraceptive users being excluded from the study, the only contraceptive method reported was condom use –6 participants. The most reported supplement used was vitamins (11.4%); a very small percentage also reported calcium - vitamin D (1.3%), zinc (0.4%) and magnesium (0.4%) use.

4.5. Results for Nutritional Habits

The frequency distribution of the participants in terms of their nutritional habits is displayed in table 6. Dairy products, vegetables and fruits, bakeries and pastries were most frequently consumed, while sea foods were the least frequently consumed foods.

Table 6. Frequency distributions of the participants in terms of nutritional habits

Nutritional Group	Never n(%)	1-2 times / month n(%)	1-2 times / week n(%)	At least once / day n(%)
Dairy products	1 (0.4%)	8 (3.5%)	61 (26.8%)	158 (69.3%)
Red meat	17 (7.5%)	102 (44.7%)	102 (44.7%)	7 (3.1%)
White meat	7 (3.1%)	53 (23.2%)	158 (69.3%)	10 (4.4%)
Seafood	22 (9.6%)	160 (70.2%)	45 (19.8%)	1 (0.4%)
Vegetables and fruits	3 (1.3%)	17 (7.5%)	96 (42.1%)	112 (49.1%)
Fast food	4 (1.8%)	112 (49.1%)	97 (42.5%)	15 (6.6%)
Salami and sausages	22 (9.6%)	105 (46.1%)	97 (42.5%)	4 (1.8%)
Bakeries and pastries	0 (0.0%)	40 (17.5%)	134 (58.8%)	54 (23.7%)
Dessert	2 (0.9%)	49 (21.5%)	147 (64.4%)	30 (13.2%)
Carbonated/sugary drinks	17 (7.5%)	68 (29.8%)	113 (49.6%)	30 (13.2%)

4.6. Results from the PMSS

Table 7 shows the results obtained from the PMSS. The average PMSS score of the participants was 131.6 ± 35.98 and PMSS scores ranged from 44 to 220. According to the 132 cut-off point, 111 (48.7%) participants were PMS negative while 117 (51.3%) were PMS positive (see Figure 1).

Table 7. Scores obtained from the PMSS (n=228)

Descriptive Statistics	Scores
PMSS	
Average	131.6
Std. deviation	35.98
Median	132.0
Minimum	44.0
Maximum	220.0
PMSS score	n (%)
<132	111 (48.7%)
≥132	117 (51.3%)

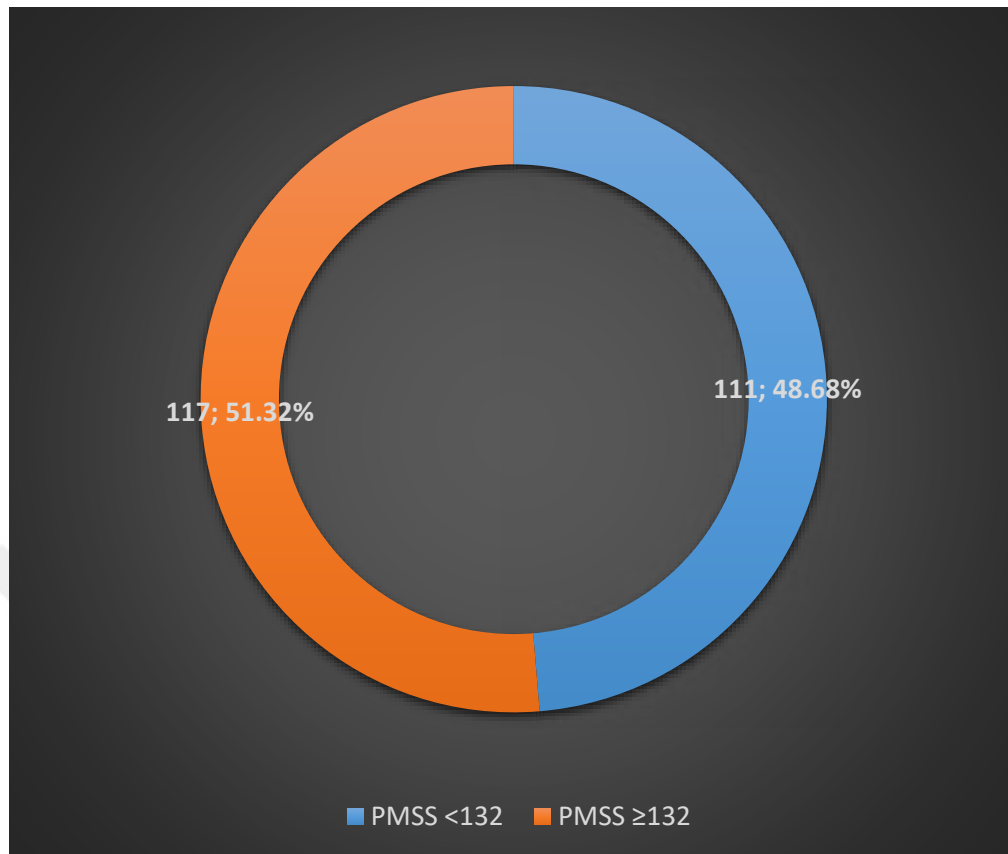


Figure 2. Participants with and without PMS

4.7. Results for Socio-Demographic and Menstrual Characteristics in the Groups

The results for the socio-demographic and menstrual characteristics of the participants according to the groups with and without PMS are displayed in table 8. No statistically significant difference was observed between the group with PMS and the group without PMS in terms of mean age, BMI, age at menarche, length of menstrual cycle, length of menstrual flow, regularities of menstruation, menstrual pain and use of analgesics for menstrual pain ($p > 0.05$). On the contrary, compared to the group without PMS, the income-expenditure balance was significantly more impaired in the group with PMS; income < expenditure ($p < 0.001$) (see Figure 3).

Table 8. Socio-demographic and menstrual characteristics of the participants in the groups

Characteristic (n=228)	Without PMS (n=111)	With PMS (n=117)	p-value
Age (years, mean±SD)	20.2±1.3	19.9±1.3	0.079†
Body mass index (kg/m², mean±SD)	22.1±4.5	22.3±4.0	0.837†
Age at menarche (years, median (min-max))	13 (10-15)	13 (10-15)	0.363¶
Length of cycle (days, median (min-max))	28 (18-45)	28 (21-50)	0.259¶
Length of flow (days, median (min-max))	6 (2-8)	6 (2-8)	0.865¶
Regular cycle			
Yes	96 (86.5%)	99 (84.6%)	0.831\$
No	15 (13.5%)	18 (15.4%)	
Menstrual pain			
Yes	76 (68.5%)	92 (78.6%)	0.082‡
No	35 (31.5%)	25 (21.4%)	
Use of analgesics for Menstrual Pain			
Yes	39 (35.1%)	51 (%43.6)	0.192‡
No	72 (64.9%)	66 (56.4%)	
Income level of family			
Income > expenditure n(%)	15 (13.5%)	3 (2.6%)	<0.001‡
Income = expenditure	48 (43.2%)	40 (34.2%)	
Income < expenditure	48 (43.2%)	74 (63.2%)	

† Student's t test, ‡ Pearson's χ^2 test, ¶ Mann Whitney U test, \$ Continuity correction χ^2 test.

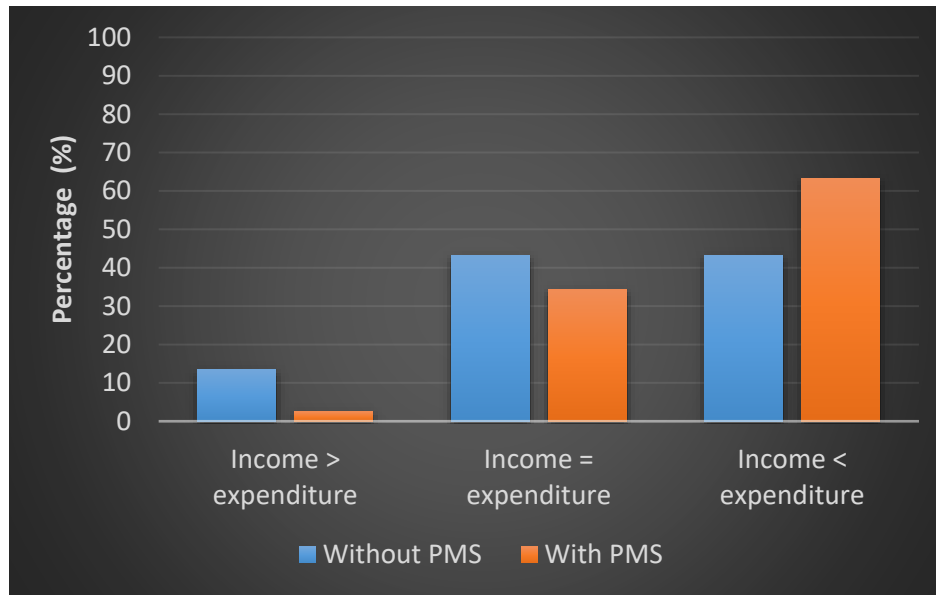


Figure 3. Distribution in terms of income level of family in the groups

4.8. Results for Risk Factors Related to PMS in the Groups

Table 9 shows the results for the participants in terms of the risk factors related to PMS according to the groups with and without PMS. Regarding smoking, frequency of smoking per day, alcohol use, frequency of alcohol consumption per week, physical activity, frequency of physical activity per week, yoga/meditation, frequency of yoga/meditation per week, daily coffee consumption, daily tea consumption, addition of extra salt before tasting, and the type of drinking water; there was no statistically significant difference between the group with PMS and the group without PMS ($p > 0.05$). On the contrary, there was a statistically significant difference ($p = 0.049$) between the groups in terms of the amount of water consumed daily, however, the difference was not clinically significant.

Additionally, in terms of the presence of premenstrual complaint in mother or sister, when anger is especially uncontrollable, presence of chronic disease, constant medication and the use of a contraceptive method; there was no statistically significant difference between the group with PMS and the group without PMS ($p > 0.05$). However, the percentage of the participants with the inability to control anger sometimes was significantly higher in the group with PMS compared to the group without PMS ($p = 0.024$). Furthermore, compared to the group without PMS, the percentage generally feeling stressed in the group with PMS was also significantly higher ($p < 0.001$) (see Figure 4). In addition, compared to the group without PMS, the percentage of participants on vitamin/mineral supplements in the group with PMS was significantly higher ($p = 0.031$).

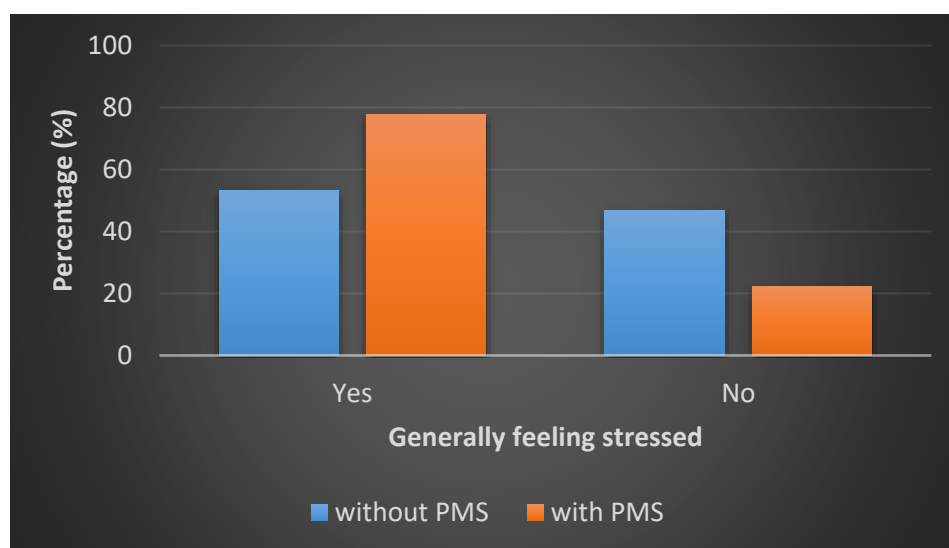


Figure 4. Distribution in terms of stress in the groups

Whereas no statistically significant difference was observed between the group with PMS and the group without PMS in terms of the negative effects of menstrual discomforts on academic, professional and family life; compared to the group without PMS, the effect of menstrual discomforts on social life was found to be significantly higher in the group with PMS ($p < 0.001$) (see Figure 5). In addition, irregular sleep was significantly higher in the group with PMS than in the group without PMS ($p = 0.009$) (see Figure 6).

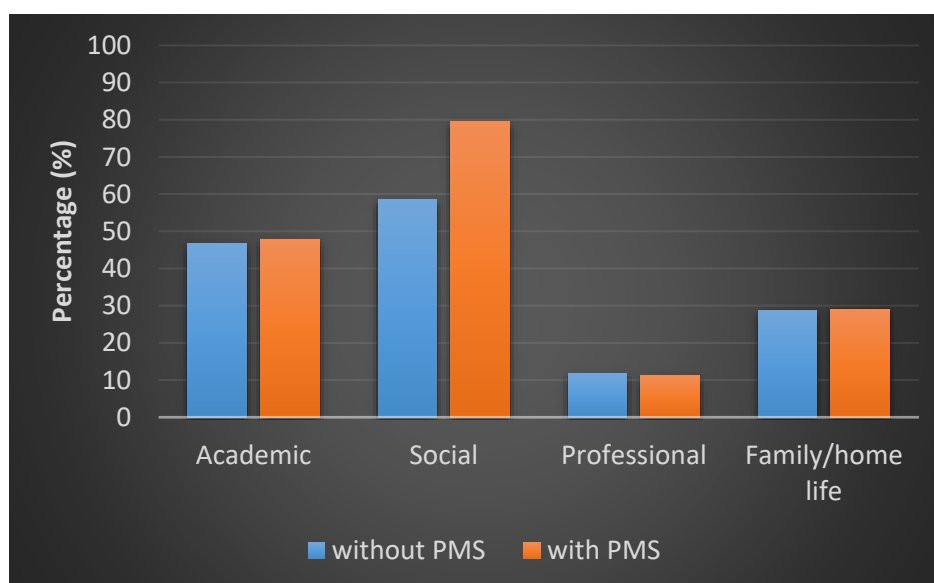


Figure 5. Distribution in terms of the effect of PMS in the groups

Table 9. Distribution in terms of risk factors related to PMS in the groups (n=228).

Characteristic	Without PMS (n=111)	With PMS (n=117)	p-value
Currently smoking			
No	94 (84.7%)	92 (78.6%)	0.314†
Yes	17 (15.3%)	25 (21.4%)	
Frequency of smoking (median (min - max))	7 (3-20)	7 (1-20)	0.688‡
Alcohol use			
No	98 (88.3%)	91 (77.8%)	0.054†
Yes	13 (11.7%)	26 (22.2%)	
Frequency of alcohol intake (median (min-max))	1 (1-4)	1 (1-7)	0.670‡
Physical activities			
No	82 (73.9%)	87 (74.4%)	0.933¶
Yes	29 (26.1%)	30 (25.6%)	
Frequency of physical exercise (median (min-max))	4 (1-7)	4 (1-7)	0.517‡
Yoga / Meditation			
No	109 (98.2%)	112 (95.7%)	0.447\$
Yes	2 (1.8%)	5 (4.3%)	
Frequency of yoga/meditation (median (min - max))	3 (2-4)	1 (1-3)	0.190‡
Coffee consumption (median (min - max))	1 (0-6)	1 (0-6)	0.968‡
Tea consumption (median (min - max))	2 (0-6)	1.5 (0-10)	0.301‡
Adding extra salt before tasting			
Yes	35 (31.5%)	26 (22.2%)	0.112¶
No	76 (68.5%)	91 (77.8%)	
Daily water intake (median (min - max))	7 (3-16)	7 (2-15)	0.049‡
Type of drinking water			
Mains water	9 (8.1%)	14 (12.0%)	0.455†
Commercially sold water	72 (64.9%)	87 (74.4%)	0.119¶
Mineral water	9 (8.1%)	10 (8.5%)	>0.999†
Water obtained by purification device	27 (24.3%)	28 (23.9%)	0.945†

† Continuity corrected χ^2 test, ‡ Mann Whitney U test, ¶ Pearson's χ^2 test, \$ Fisher's exact probability test.

Table 9. Distribution in terms of risk factors related to PMS in the groups (n=228) (continued)

Characteristic	Without PMS (n=111)	With PMS (n=117)	p-value
Premenstrual complaint in mother or sister			
Yes	55 (49.5%)	60 (51.3%)	0.794¶
No	56 (50.5%)	57 (48.7%)	
Inability to control anger sometimes			
Yes	93 (83.8%)	110 (94.0%)	0.024‡
No	18 (16.2%)	7 (6.0%)	
When anger is especially uncontrollable			
Before menstruation	63 (67.7%)	76 (69.1%)	0.710¶
During menstruation	23 (24.7%)	23 (20.9%)	
Always	7 (7.5%)	11 (10.0%)	
Generally feeling stressed			
Yes	59 (53.2%)	91 (77.8%)	<0.001¶
No	52 (46.8%)	26 (22.2%)	
Areas affected by menstrual discomforts			
Academic	52 (46.8%)	56 (47.9%)	0.878¶
Social	65 (58.6%)	93 (79.5%)	<0.001¶
Professional	13 (11.7%)	13 (11.1%)	>0.999‡
Family / home life	32 (28.8%)	34 (29.1%)	0.969¶
Presence of a chronic disease	5 (4.5%)	12 (10.3%)	0.161‡
Constant medication	4 (3.6%)	9 (7.7%)	0.296‡
Use of contraceptive method	1 (0.9%)	5 (4.3%)	0.214\$
Vitamin / mineral supplement	9 (8.1%)	22 (18.8%)	0.031‡
Sleep pattern			
Regular sleep	62 (55.9%)	45 (38.5%)	0.009¶
Irregular sleep	49 (44.1%)	72 (61.5%)	

† Continuity corrected χ^2 test, ¶ Pearson's χ^2 test, \$ Fisher's exact probability test.

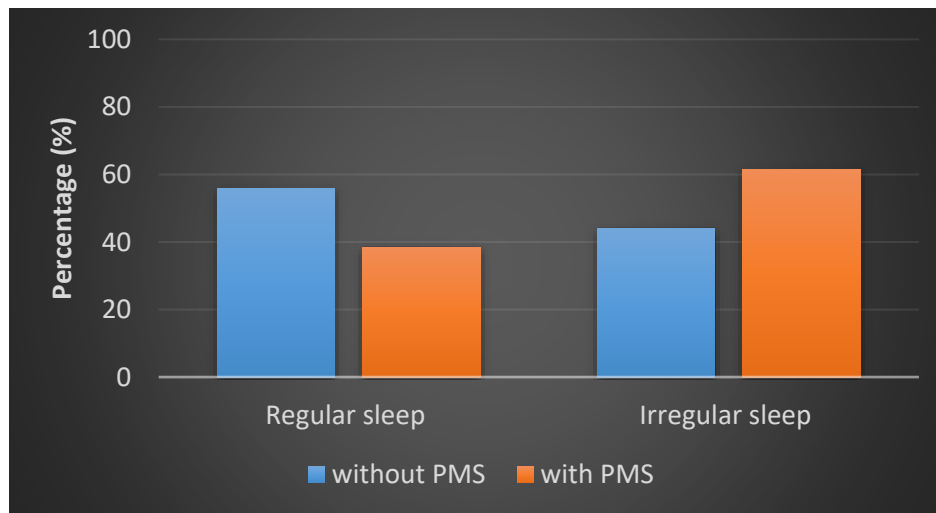


Figure 6. Distribution in terms of sleep pattern in the groups

4.9. Results for Nutritional Habits in the Groups

Table 10 shows the distribution of the participants in terms of nutritional habits according to the groups with and without PMS. Between the group with PMS and the group without PMS, there was no statistically significant difference regarding the frequency of dairy products, sea food, vegetables and fruits, salami and sausages, pastries and dessert consumption ($p > 0.05$).

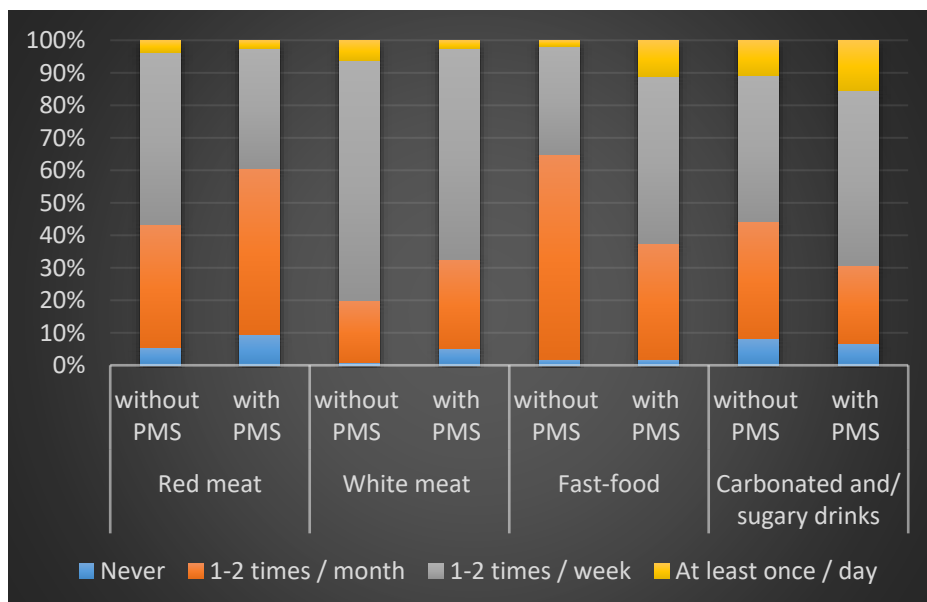


Figure 7. Distribution in terms of the consumption of red meat, white meat and carbonated and/or sugary drinks in the groups

Table 10. Distribution in terms of nutritional habits in the groups (n=228)

Nutritional Group	Without PMS (n=111)	With PMS (n=117)	p-value †
Dairy products			
Never	1 (0.9%)	0 (0.0%)	0.970
1-2 times / month	4 (3.6%)	4 (3.4%)	
1-2 times / week	29 (26.1%)	32 (27.4%)	
At least once / day	77 (69.4%)	81 (69.2%)	
Red meat			
Never	6 (5.4%)	11 (9.4%)	0.009
1-2 times / month	42 (37.8%)	60 (51.3%)	
1-2 times / week	59 (53.2%)	43 (36.8%)	
At least once / day	4 (3.6%)	3 (2.6%)	
White meat			
Never	1 (0.9%)	6 (5.1%)	0.012
1-2 times / month	21 (18.9%)	32 (27.4%)	
1-2 times / week	82 (73.9%)	76 (65.0%)	
At least once / day	7 (6.3%)	3 (2.6%)	
Sea food			
Never	11 (9.9%)	11 (9.4%)	0.951
1-2 times / month	77 (69.4%)	83 (70.9%)	
1-2 times / week	23 (20.7%)	22 (18.8%)	
At least once / day	0 (0.0%)	1 (0.9%)	
Vegetables and fruits			
Never	0 (0.0%)	3 (2.6%)	0.819
1-2 times / month	9 (8.1%)	8 (6.8%)	
1-2 times / week	49 (44.1%)	47 (40.2%)	
At least once / day	53 (47.7%)	59 (50.4%)	

† Mann Whitney U test.

Table 10. Distribution in terms of nutritional habits in the groups (**n=228**) (continued)

Nutritional Group	Without PMS (n=111)	With PMS (n=117)	p-value †
Fast-food			
Never	2 (1.8%)	2 (1.7%)	<0.001
1-2 times / month	70 (63.1%)	42 (35.9%)	
1-2 times / week	37 (33.3%)	60 (51.3%)	
At least once / day	2 (1.8%)	13 (11.1%)	
Salami and sausages			
Never	14 (12.6%)	8 (6.8%)	0.165
1-2 times / month	52 (46.8%)	53 (45.3%)	
1-2 times / week	43 (38.7%)	54 (46.2%)	
At least once / day	2 (1.8%)	2 (1.7%)	
Bakeries and pastries			
Never	0 (0.0%)	0 (0.0%)	0.235
1-2 times / month	23 (20.7%)	17 (14.5%)	
1-2 times / week	64 (57.7%)	70 (59.8%)	
At least once / day	24 (21.6%)	30 (25.6%)	
Dessert			
Never	1 (0.9%)	1 (0.9%)	0.884
1-2 times / month	23 (20.7%)	26 (22.2%)	
1-2 times / week	74 (66.7%)	73 (62.4%)	
At least once / day	13 (11.7%)	17 (14.5%)	
Carbonated and/ or sugary drinks			
Never	9 (8.1%)	8 (6.8%)	0.048
1-2 times / month	40 (36.0%)	28 (23.9%)	
1-2 times / week	50 (45.0%)	63 (53.8%)	
At least once / day	12 (10.8%)	18 (15.4%)	

† Mann Whitney U test.

4.10. The Best Predicting Factors for PMS

Table 11 displays the best predicting factors for PMS as determined by multiple logistic regression analysis. All variables determined as $p < 0.10$ as a result of univariate statistical analyses were included in the multivariate logistic regression model as candidate factors. According to the backward elimination method, the best factors in distinguishing between the group with PMS and the group without PMS are; fast-food consumption, the effects of menstrual discomforts on social life, taking vitamin /mineral supplements, poor income and expense balance, generally feeling stressed, insufficient consumption of white meat, irregular sleep and feeling pain during menstruation.

When other possible factors were adjusted for, it was observed that fast food consumption triggered PMS development and this was statistically significant (Odds ratio = 3.291; 95% confidence interval: 1.881-5.755 and $p < 0.001$). The fact that menstrual disorders negatively affect social life was associated with PMS regardless of other factors by 3.477 times (95% Confidence Interval: 1,698-7,117) ($p < 0.001$). Compared to those who did not take vitamin/mineral supplements, the probability of PMS occurrence among participants taking vitamin/mineral supplement was statistically significant 6,832 times (95% Confidence Interval: 2,256-20,688) ($p < 0.001$).

While the odds of PMS occurrence significantly increased by 6.994 times (95% Confidence interval: 1.396-35.048) among those whose family income equated expenditure (income = expenditure) as compared to those whose family income was higher than expenditure (income > expenditure) ($p = 0.018$); the odds of PMS occurrence among those with family income less than expenditure (income < expenditure) increased by 11.725 times (95% Confidence interval: 2.417-56.877) ($p = 0.002$).

Furthermore, generally feeling stressed significantly increased the odds of PMS occurrence by 2.892 times (95% Confidence interval: 1.466-5.707) ($p = 0.002$). Regardless of other factors, the incidence of PMS decreased significantly as white meat consumption increased (Odds ratio = 0.431; 95% Confidence interval: 0.240-0.776 and $p = 0.005$).

Additionally, the odds of PMS occurrence when other factors were adjusted for significantly increased for irregular sleep (Odds ratio = 2.092; 95% Confidence interval: 1.096-3.991 and $p = 0.025$) as well as for pain during menstruation (Odds ratio = 2.185; 95% confidence interval 1.044-4.574 and $p = 0.038$).

Table 11. The best predicting factors for PMS as determined by multiple logistic regression analysis.

Characteristic	Odds ratio	95% Confidence interval		Wald	p-value
		Lower limit	Upper limit		
Income = expenditure	6.994	1.396	35.048	5.595	0.018
Income < expenditure	11.725	2.417	56.877	9.335	0.002
Menstrual pain	2.185	1.044	4.574	4.300	0.038
Generally feeling stressed	2.892	1.466	5.707	9.380	0.002
Social life affected	3.477	1.698	7.117	11.621	<0.001
Vitamin / mineral supplement	6.832	2.256	20.688	11.557	<0.001
Sleep irregularity	2.092	1.096	3.991	5.013	0.025
White meat consumption	0.431	0.240	0.776	7.865	0.005
Fast food consumption	3.291	1.881	5.755	17.438	<0.001

5. DISCUSSION

According to the results of the statistical analyses performed for this analytic and cross-sectional study, 51.3% of the 228 midwifery students in the faculty of Health Sciences at Aydın Adnan Menderes University had PMS according to the PMSS. Furthermore, it was observed that while PMS was significantly linearly associated with fast-food consumption, the effects of menstrual discomforts on social life, taking vitamin /mineral supplements, poor income and expense balance, generally feeling stressed, irregular sleep and feeling pain during menstruation; it was inversely associated with the consumption of white meat.

5.1. Prevalence

The prevalence of PMS (51.3%) found in this study using the PMSS is consistent with the prevalence reported by other studies conducted both in Turkey and in other countries. Direkvand-Moghadam et al. (2014), in their meta-analysis reviewing the prevalence of PMS, reported a global PMS prevalence of 47.8% as well as a national prevalence of 50% for Turkey. Moreover, in a local study including 184 students in Turkey, the prevalence of PMS was found to be 50.2% using the PMSS (Selçuk et al., 2014). Another local study using the PMSS also reported a prevalence of 43.8% among 426 students (Yilmaz-Akyuz and Aydin-Kartal, 2019). Nworie et al. (2018), in addition, reported a prevalence of 47.6% among 480 students in Nigeria using the Calendar of Premenstrual Experiences.

On the contrary, the obtained prevalence is inconsistent with some other studies. Tschudin et al. (2010), using the Premenstrual Screening Tool, obtained a prevalence of 10.3% for 3522 Swiss women in his population-based study. This low figure could be attributed to the use of a modified version of the Premenstrual Screening Tool, and also to the large sample size. Chumpalova et al. (2020) reported a prevalence of 32% among 305 female students in Bulgaria having used the DSM-IV as diagnostic tool. The lower prevalence obtained in the previously mentioned study compared to what was obtained in the present study could be explained as being due to the use of the DSM-IV diagnostic tool which is considered to consist of stringent criteria thereby usually yielding a lower percentage for prevalence (O'Brien et al., 2014). Also, using the PMSS as a diagnostic tool, Sut and Mestogullari (2015) obtained a prevalence of 38.1%, and this variation in prevalence could be potentially due to the fact that the study population consisted of practising nurses who may

have a healthier lifestyle in general due to their knowledge in health. Insincere reporting due to a socio-cultural background which considers discussing PMS and its related topics a taboo is a potential reason for a lower prevalence of 35.3% reported by Hashim et al. (2019) in their study consisting of 300 students in UAE. Costanian et al. (2018); Abeje and Berhanu (2019); on the other hand, both using the ACOG criteria as a diagnostic tool reported a higher prevalence (81.3% and 63% respectively) probably attributable to the use of the ACOG criteria since, unlike the DSM-IV, the ACOG criteria is deemed rather liberal and results in higher rates of PMS when used (O'Brien et al., 2014). Also, a higher prevalence is possibly as a result of younger population as could be the case of Abeje and Berhanu (2019) who reported a mean age of 13.23 ± 1.47 years.

5.2. Factors Related to PMS

PMS was associated with taking vitamin /mineral supplements, poor income and expense balance, generally feeling stressed, irregular sleep, feeling pain during menstruation and the consumption of fast-food and white meat according to the results in this study. Inability to sometimes control anger, the amount of daily water intake and the consumption of red meat and carbonated drinks were no longer significantly associated with PMS after multiple logistic regression analyses had been performed. No association was found between PMS and the following factors related to lifestyle which have been reported to be associated with PMS in previous studies; BMI, smoking, alcohol use, physical activity, yoga/meditation, caffeine consumption, chronic diseases, medication, and the consumption of dairy products (Bertone-Jones et al., 2005; Bertone-Johnson et al., 2008; Bertone-Jones et al., 2009; Bertone-Johnson et al., 2010; Tschudin et al., 2010; Seedhom et al., 2013; Tsai, 2016; Costanian et al. 2018; Dehnavi et al., 2018; Yilmaz-Akyuz and Aydin-Kartal, 2019).

Women use vitamin/mineral supplements for various reasons such as prophylactic purposes, cosmetic purposes and treatment purposes. The use of vitamins/minerals (vitamins, calcium - vitamin D, zinc and magnesium) was found among 13.74% of the study's participants. Interestingly, this was found to be positively associated with PMS. This finding is consistent with the findings of Chocano-Bedoya et al. (2011) which established a linear relationship between PMS development and supplemental intakes of B vitamins specifically; thiamine, riboflavin, niacin, vitamin B-6, folate, and vitamin B-12 in their prospective study among American nurses. Supplementary vitamin and mineral intake is thought to function as a consequence of already existent PMS as some PMS patients and doctors consider

supplementary vitamin and mineral intake as a preventive measure against episodes of PMS (Chocano-Bedoya et al., 2011). Chocano-Bedoya et al. (2012), however, reported that there was no significant association between the supplementary intakes of minerals (iron, zinc, magnesium, copper, potassium, and manganese) and the development of PMS. Moreover, Bertone-Jones et al. (2005); Kroll-Desrosiers et al. (2017); have reported a negative association of calcium - vitamin D with the occurrence of PMS. Inconsistencies between this study and the above mentioned studies may be due to fewer number of participants using supplementary vitamin and minerals and also the analysis of all vitamins and minerals as one factor without detailed analysis.

In the present study, 38.6% of the participants reported having family income equal to expenditure (income = expenditure) whereas 53.5% of the participants had family income less than expenditure (income < expenditure). Poor income-expenditure balance was found to be positively associated with PMS. This is in agreement with Costanian et al. (2018) who indicated that PMS was significantly positively related with father's income level. To the author's knowledge, there has been no in-depth study on the association between income level and the occurrence of PMS. The few studies that casually examined this relationship between PMS and income level alongside other factors reported a null significant association (Pinar and Öncel, 2011; Faramarzi et al., 2014; Rad et al., 2018). Many studies have demonstrated the strong relationship between socio-economic level and health with lifestyle as a mediator (Wang et al., 2019). The association reported in the present study is attributable to the fact that insufficient income level adversely affects the lifestyle choices of the individual which in turn increases the risk for PMS. More future studies are required to confirm this finding and establish how exactly low income affects the occurrence of PMS.

Stress is defined as the process that occurs when a situation considered to be relevant to one's well-being has the ability to result in harm or loss and hence necessitates psychological, physiological, and/or behavioural efforts to manage the situation and its outcomes (Salomon, 2013). Through the data collection questionnaire, 65.8% of the participants indicated that they more often than not found themselves in stressful situations. Moreover, the state of generally feeling stressed was determined as a predicting factor for PMS. Gollenberg et al. (2010) established in their longitudinal study that high perceived stress as a causative/contributing factor increased the number of symptoms and severity of PMS. Yamamoto et al. (2009); Fernandez et al. (2019) both contributed to this evidence by indicating in their studies that psychosocial stress had a significant effect on the development of PMS. Stress is thought to be both causative and consequent factor; whereas the anticipation and experience of other

PMS symptoms could function as stressor and result in stress, it has been hypothesised, on the other hand, that hypothalamic-pituitary-adrenal (HPA) activation axis due to stress resulting in hypothalamic-pituitary-gonadal (HPG) axis inhibition contributes to the development of problems related to menstruation together with the mechanisms of corticotrophin-releasing hormone (CRH), vasopressin, and endogenous opioid peptides (Yamamoto et al., 2009)

Cheng et al. (2013); Arafa et al. (2020); Costanian et al. (2018) all have established that sleep disorders - such as insomnia, and its pointers – such as the use of sleeping pills, are linearly associated with the occurrence of PMS. This is consistent with the findings of the present study according to which perceived irregular sleep was found to be positively associated with PMS. The relationship between irregular sleep and PMS is believed to be bidirectional seeing as, on the one hand, there is a possibility for a woman with PMS to experience poor quality of sleep due to the PMS physiopathology and symptoms such as pain, anxiety and changes in appetite; and on the other hand, irregular sleep may interfere with the normal functioning of the body resulting either directly in the development of PMS or indirectly by leading to other established factors related to PMS such as obesity and stress (Medic et al., 2017).

Menstruation is sometimes accompanied by pain/cramps in the pelvis and lower abdomen which resolves in about 3 days. The pain may extend to the back and lower extremities and may also be accompanied by diarrhoea or nausea. (WHO, 2019b). Of the current study's sample, 73.7% reported experiencing menstrual pain. This indicates the presence of dysmenorrhoea in a rather unignorable large proportion of the current study's sample. Moreover, dysmenorrhoea was found to be significantly linearly correlated with the occurrence of PMS. The strong association between PMS and dysmenorrhoea has been reported by several studies (Yamamoto et al., 2009; Oral et al., 2012; Oraby et al. 2016; Arafa et al. 2018). It has been suggested that similarities in symptoms for both PMS and dysmenorrhoea, PMS symptoms overlapping into the menstrual phase and similar management and interventions for both PMS and dysmenorrhoea could account for this association (Booton and Seidernan, 1989). The result obtained in the present study contradicts the result obtained by another author (Rupani and Lema, 1993). This variation could be due to differences in diagnosis criteria and social-cultural background as the topic of menstruation is considered a taboo in certain cultures causing some participants to not sincerely report symptoms.

Fast food is generally processed quick meals sold at affordable prices. Its consumption is not uncommon among the youth and students and the situation was no different from the

participants of the current study mostly because a greater percentage live in the dormitories where the food served is considered unappetizing, and those who have the opportunity to prepare their own meals do not seem to find time to do so due to perceived academic stress. Unfortunately, similar to the findings of other studies - Seedhom et al. (2013); Cheng et al. (2013); Rupa Vani et al, (2013); Selçuk et al. (2014) Rad et al. (2018); Hashim et al. (2019); fast-food consumption increased the risk for PMS by 3.3 times according to the results of the present study. Oral et al. (2012) also found an association between PMS and fast-food consumption which was not significant. Rupa Vani et al, (2013) speculated that high amounts of saturated fatty acids contained in fast-foods contain may interfere with progesterone metabolism during the luteal phase and cause PMS. Moreover, lack of micronutrients in fast-food could explain the association between fast-food consumption and PMS since fast-foods contain minimal micronutrients and some others have established a positive correlation between PMS and low intake of micronutrients such as calcium, vitamin D, iron, thiamine and riboflavin (Bertone-Jones et al., 2005; Chocano-Bedoya et al., 2011; Chocano-Bedoya et al., 2012; Kroll-Desrosiers et al. 2017). The findings of the present study regarding fast-food consumption disagree with another study and this could be due to variations in the tools used to measure fast food intake frequency and PMS (Mohadirizi and Kordi, 2015).

Chicken and turkey are among the most common sources of white meat in Turkey; they are relatively affordable as well. An interesting finding of the current study was a negative association of PMS with white meat consumption (OR: 0.431). The result implies that the more the participant ate white meat, the less likely they were to experience PMS. It is believed that relatively less saturated fatty acid content in white meat particularly the lean portion reduces interference with progesterone mechanism during the luteal phase leading to less risk of PMS (Rupa Vani et al., 2013; USDA, 2020a). Although the vitamin and mineral content of white meat may not be as high as that of red meat, fruits and vegetables, the moderate amount present in white meat in combination with other mechanisms such as possible reduced interference with progesterone is believed to positively impact the occurrence of PMS (USDA, 2020a). Very few studies if any at all have examined the relationship between specifically, white meat consumption and the occurrence of PMS. Houghton et al. (2019) mentioned that while there was no association between PMS risk and total protein in general, there was an inverse association between PMS risk and the consumption of animal protein among younger participants. Furthermore, Mohamadirizi and Kordi (2015) stated from their study that PMS was not associated with salty-fatty food consumption which included chicken in their study. The variation in findings may be

potentially due to the examination of factors including sources of white meat instead of only white meat as a factor as is the case of the present study. Future prospective and longitudinal studies are necessary as the mechanism for this association is very unclear.

Consumption of red meat was no longer significantly correlated with PMS after other factors had been adjusted for. Being a rich natural source of iron and vitamins, the consumption of meat could help reduce PMS risk as these have been reported to reduce PMS risk (Chocano-Bedoya et al., 2012; USDA, 2020b).

Daily amount of water intake was also no longer significant after adjustments for other factors. Muñoz et al. (2015) suggest a positive effect of high intake of fluids on mood. This implies high intake of fluids especially during the luteal phase could help relieve mood symptoms of PMS.

Inability to sometimes control anger was no longer significant after multiple regression analyses as well. Irritability/angry outburst/anger could be considered rather as an affective symptom or consequence of PMS rather than a causative factor (Freeman EW, 2004; Nworie KM, 2018).

Lastly under this category is carbonated drinks consumption which was also no longer significant after multiple regression analyses. Yilmaz-Akyuz and Aydin-Kartal (2019) reported reduction in PMS scores when participants were administered an exercise programme and a restricted diet including a restriction in carbonated drinks consumptions.

Even though some studies have depicted an association for some, no association was found between PMS and BMI, smoking, alcohol use, physical activity, yoga/meditation, caffeine consumption, excessive salt intake, chronic diseases, medication, type of water consumed and the consumption of dairy products, seafood, sausages, bakeries/ pastries and desserts (Bertone-Jones et al., 2005; Bertone-Johnson et al., 2008; Bertone-Jones et al., 2009; Bertone-Johnson et al., 2010; Tschudin et al., 2010; Seedhom et al., 2013; Tsai, 2016; ostanian et al. 2018; Dehnavi et al., 2018; Yilmaz-Akyuz and Aydin-Kartal, 2019). Potential reasons for not finding any association in the present study may include the following: The study was aimed at examining the relationship between PMS and lifestyle factors in general hence each factor was not examined in a detailed manner, had they been examined in detail, an association would have perhaps been found between PMS and some of these factors particularly those that have been consistently reported to have an association with PMS. Furthermore, the distribution of participants in terms of some these factors probably did not allow effective comparison; for instance the average BMI of the study sample was 22.2 ± 4.24 kg/m² and very few of the participants were overweight or actually obese compared to the

number of participants with a normal weight, and this case was similar for the distribution in terms of yoga/meditation, chronic diseases and medication. The sample size which was relatively small has a potential of yielding a variation in results. Moreover, the characteristics of the participants such as their age (average: 20.1 ± 1.3 years, 18-24 years) which has been reported to affect outcome of studies related to PMS, programme of study (midwifery) which consciously and unconsciously creates awareness about the effect of lifestyle on reproductive health and hence leads to healthier lifestyle choices among students, status as students which is demanding and involves a slightly different way of living compared to the average Turkish person and socio-cultural background which frowns upon certain things including pre-marital sex and alcohol consumption especially among women causing the participants to actually avoid such lifestyle or to be insincere in answering questions about these factors – for instance contraceptive use, could have resulted in varying results in this study (Tschudin et al., 2010; Houghton et al., 2019).

5.3. The Effect of PMS on Life

A major component of PMS's definition is its effect and interference with lifestyle (O'Brien et al., 2014; Hofmeister et al. 2016; WHO, 2019a) According to the results of this study, PMS discomforts/symptoms had a significant effect on the social lives of the participants. Dennerstein et al. (2010) reported in their study examining the effect of PMS on the activities of daily life among women selected from 8 countries in 2 continents that premenstrual symptoms affected the activities of daily lives including the social domain of these women. Victor et al. (2019), moreover, reported a significant decrease in the quality of life in the social domain due to PMS in their study of a student population in Brazil. Additionally, Pinar and Öncel (2011), in their study of women between 15 and 49 years in Turkey, also reported an effect of PMS on the social functioning of their participants. This result supports the fact that the effect of PMS on the lives of women in every area, especially in their social lives, is crucial and should not be overlooked.

Dennerstein et al. (2010); Oral et al. (2012); Sut and Mestogullari (2015); Buddhunyakan et al. (2017); Nworie et al. (2018); Victor et al. (2019); reported a significant effect of PMS on other areas of life including academic, professional and family life. However the effect of PMS on these areas reported in this study were not found to be statistically significant. This could be as a result of the fact that since it was not the main

focus of this study to examine the effect of PMS on women's life, interrogation on this topic was not thorough hence a differing result.



6. CONCLUSION

In the present study, 51.3% of the 228 midwifery students in the faculty of Health Sciences at Aydın Adnan Menderes University had PMS according to the PMSS. Furthermore, it was observed that while PMS was significantly linearly associated with fast-food consumption, the effects of menstrual discomforts on social life, taking vitamin /mineral supplements, poor income and expense balance, generally feeling stress, irregular sleep and feeling pain during menstruation; it was inversely associated with the consumption of white meat. Based on the results of this study, the following recommendations are made:

- With approximately half of the study population living with PMS, which interferes with lifestyle, and more than half reportedly experiencing dysmenorrhoea, it behoves on health care providers particularly physicians and midwives not to overlook symptoms or related complaints. Treatment as basic as the administration of analgesics to relieve unbearable symptoms such as pain should be made readily available; this would fairly reduce the likelihood of over-the-counter drug abuse. Moreover, screening to remove the possibility of an underlying disease and confirm the presence of core PMS in order to administer to the right treatment should also be made readily available.
- Midwives ought to empathise with patients and offer a listening ear to patients when taking anamnesis; this would encourage the patient to speak up in the course of seeking medical treatments. There is a need for midwives and other healthcare providers to refrain from statements such as, “This is normal. Every woman experiences this”.
- Education about PMS in schools should be encouraged in order to create awareness and break the silence over this topic as it is still considered a taboo in most cultures even today. This would encourage more women to be willing to open up and seek treatment.
- For women who are not enrolled in any educational institute, the creation of support groups would be an effective platform for these women to talk about their experiences with PMS as well as receive evidence-based knowledge on PMS.
- Since PMS was found to affect the social lives of the participants in the current study, the education of the general public including men would increase empathy and social support for their wives, daughters, co-workers, friends, sisters, students etc. experiencing PMS. It is believed that when women feel people in their immediate environment understand their plight, it makes it easier for them to explore measures for relief.

- PMS was found to be significantly and positively associated with poor income-expenditure balance. Therefore, financial support for families living in especially very poor conditions would reduce poor lifestyle choices, for instance poor nutrition, that increase the risk of PMS and increase better lifestyle choices that decrease the risk of PMS.
- Particularly for women with mild to moderate PMS, the following lifestyle modifications based on the findings of the present study are recommended:
 - Fast-food consumption should be reduced to the barest minimum, instead, women should make every effort to have breakfast and increase the intake of vegetables, fruits and home-cooked meals. This would reduce the likelihood of becoming hungry during the course of the day and hence resorting to fast-food.
 - Stressors should be identified and if possible eliminated. In cases where elimination is not possible learning and applying coping strategies would reduce the level of perceived stress which may lead to PMS development.
 - Regular and sufficient sleep of about 7-9 hours per day especially among students is encouraged to reduce the probability of PMS development due to insufficient and irregular sleep.
 - Although the mechanism is barely understood, white meat consumption instead of less healthy sources of protein such as red meat should be encouraged more as it was found to decrease the risk PMS occurrence.

A major strength of the present study is the fact that, to the author's knowledge, this the first study to have examined and found a relationship between PMS and specifically, white meat consumption. Future prospective and longitudinal studies on a larger scale are recommended for confirmation, generalisation and comprehension of its mechanism.

Recall bias could affect accurate recollection of symptom experience. Moreover, the fact that symptoms were self-reported could lead to either over-estimation or under-estimation of the severity of symptoms depending on how the participant perceived it. Another weakness of this study is that it was conducted on a student population which may have different features compared to the general population. This implies that the result may not be liberally generalised to the general population as would easily be in the case of a population-based study. Lastly, symptom report was not specified to a specific amount of time - for instance, the previous 3 months or 1 year. This allows for participants who were experiencing symptoms similar to PMS but not due to PMS probably for the first time to be wrongfully diagnosed with PMS according to the scale.

7. REFERENCES

- Abeje A, Berhanu Z.** Premenstrual syndrome and factors associated with it among secondary and preparatory school students in Debremarkos town, North-west Ethiopia, *BMC Research Notes* 2019, 12, 535-539.
- American College of Obstetricians and Gynaecologists.** Guidelines for Women's Health Care: A Resource Manual. 4th ed. Washington, DC, American College of Obstetricians and Gynecologists, 2014, 607-613.
- American Psychiatric Association.** Diagnostic and Statistical Manual of Mental Disorders. 5th ed. Washington, DC, American Psychiatric Association, 2013.
- Arafa A, Mahmoud O, Salem EA, Mohamed A.** Association of sleep duration and insomnia with menstrual symptoms among young women in Upper Egypt. *Middle East Current Psychiatry* 2020, 27:2.
- Arafa AE, Senosy SA, Helmy HK, Mohamed AA.** Prevalence and patterns of dysmenorrhea and premenstrual syndrome among Egyptian girls (12–25 years). *Middle East Fertility Society Journal* 2018, 23, 486–490.
- Bertone-Johnson ER, Hankinson SE, Bendich A, Johnson SR, Willett WC, Manson JE.** Calcium and Vitamin D Intake and Risk of Incident Premenstrual Syndrome. *Arch Internal Medicine* 2005, 165, 1246-1252.
- Bertone-Johnson ER, Hankinson SE, Johnson SR, Manson JE.** Cigarette Smoking and the Development of Premenstrual Syndrome. *American Journal of Epidemiology* 2008, 168(8), 938–945.
- Bertone-Johnson ER, Hankinson SE, Johnson SR, Manson JE.** Timing of Alcohol Use and the Incidence of Premenstrual Syndrome and Probable Premenstrual Dysphoric Disorder. *Journal of Women's Health* 2009, 18(12), 1945-1953
- Bertone-Johnson ER, Hankinson SE, Willett WC, Johnson SR, Manson JE.** Adiposity and the Development of Premenstrual Syndrome. *Journal of Women's Health* 2010, 19(11), 1955-1962.
- Booton DA, Seidernan RY.** Relationship between Premenstrual Syndrome and Dysmenorrhea. *AAOHN Journal* 1989, 37(8), 308-315.
- Buddhabunyakan N, Kaewrudee S, Chongsomchai C, Soontrapa S, Somboonporn W, Sothornwit J.** Premenstrual syndrome (PMS) among high school students. *International Journal of Women's Health* 2017, 9 501–505.
- Cheng SH, Shih CC, Yang YK, Chen KT, Chang YH, Yang YC.** Factors associated with premenstrual syndrome – A survey of new female university students. *Kaohsiung Journal of Medical Sciences* 2013, 29, 100-105.

Chocano-Bedoya PO, Manson JE, Hankinson SE, Johnson SR, Chasan-Taber L, Ronnenberg AG, Bigelow C, Bertone-Johnson ER. Intake of Selected Minerals and Risk of Premenstrual Syndrome. *American Journal of Epidemiology* 2012, 177(10), 1118–1127.

Chocano-Bedoya PO, Manson JE, Hankinson SE, Willett WC, Johnson SR, Chasan-Taber L, Ronnenberg AG, Bigelow C, Bertone-Johnson ER. Dietary B vitamin intake and incident premenstrual syndrome. *American Journal Clinical Nutrition* 2011, 93, 1080–1086.

Chumpalova P, Iakimova R, Stoimenova-Popova M, Aptalidis D, Pandova M, Stoyanova M, Fountoulakis KN. Prevalence and clinical picture of premenstrual syndrome in females from Bulgaria. *Annals of General Psychiatry* 2020, 19:3.

Costanian C, Akiki Z, Rabah Z, Daou S, Assaad S. Factors Associated with Premenstrual Syndrome and its Different Symptom Domains among University Students in Lebanon. *International Journal of Womens Health Wellness* 2018, 4(1).

Darabi F, Rasaie N, Jafarirad S. The Relationship between Premenstrual Syndrome and Food Patterns in University Student Girls. *Jentashapir Journal of Health Resources* 2014, 5(6).

Dehnavi ZM, Jafarnejad F, Goghary SS. The effect of 8 weeks aerobic exercise on severity of physical symptoms of premenstrual syndrome: a clinical trial study. *BioMed Central Women's Health Journal* 2018, 18:80.

Dennerstein L, Lehert P, Boackstroom TC, Heinemann K. The effect of premenstrual symptoms on activities of daily life. *Fertility and Sterility* 2010, 94(3), 1059-1064.

Direkvand-Moghadam A, Sayehmiri K, Delpisheh A, Kaikhavandi S. Epidemiology of Premenstrual Syndrome (PMS)-A Systematic Review and Meta-Analysis Study. *Journal of Clinical and Diagnostic Research* 2014, 8(2), 106-109.

Doğan H. Üniversite Öğrencilerinde Premenstrual Sendrom Görülme Sıklığı Ve Etkileyen Faktörler, Yüksek lisans tezi, Türkiye Cumhuriyeti Karabük Üniversitesi Sağlık Bilimleri Enstitüsü, Karabük 2018, 60.

ELBanna MM, ELBbandrawy AM, Elhosary EA, Gabr AA. Relation between body mass index and premenstrual syndrome. *Current Science International* 2019, 8(2), 394-402.

Endicott J, Nee J, Harrison W. Daily Record of Severity of Problems (DRSP): reliability and validity. *Arch of Women's Mental Health*, Springer-Verlag, Wein. 2006, 9(1), 43.

Faramarzi M, Kheirkhah F, Azadfrouz S. Psychological Predictors of Premenstrual Syndrome. *International Neuropsychiatric Disease Journal* 2014, 2(6), 368-381.

Ferna'ndez MM, Regueira-Me'ndez C, Takkouche B. Psychological factors and premenstrual syndrome: A Spanish case-control study. *PLoS ONE* 2019, 14(3).

Freeman EW, Halberstadt SM, Rickels K, Legler JM, Lin H, Sammel MD. Core Symptoms That Discriminate Premenstrual Syndrome. *Journal of Women's Health* 2011, 20(1), 29-35.

Freeman EW. Premenstrual Syndromes. In: JJ Sciarra (ed), Gynecology and Obstetrics (1), Lippincott Williams & Wilkins, Philadelphia, 2004.

Gençdoğan B. Premenstruel Sendrom İçin Yeni Bir Ölçek. *Türkiye’de Psikiyatri* 2006, 8(2), 81- 87.

Gollenberg AL, Hediger ML, Mumford SL, Whitcomb BW, Hovey KM, Wactawski-Wende J, Schisterman EF. Perceived Stress and Severity of Perimenstrual Symptoms: The BioCycle Study. *Journal of Women’s Health* 2010, 19(5), 959 – 967.

Hashim MS, Obaideen AA, Jahrami HA, Radwan H, Hamad HJ, Owais AA, Alardah LG, Qiblawi S, Al-Yateem N, Faris E. Premenstrual Syndrome Is Associated with Dietary and Lifestyle Behaviors among University Students: A Cross-Sectional Study from Sharjah, UAE. *Nutrients* 2019, 11, 1939-1956.

Hofmeister S, Do, Bodden S. Premenstrual Syndrome and Premenstrual Dysphoric Disorder. *American Family Physician* 2016, 94(3), 236-240.

Houghton SC, Manson JE, Whitcomb BW, Hankinson SE, Troy LM, Bigelow C, Bertone-Johnson ER. Carbohydrate and fiber intake and the risk of premenstrual syndrome. *European Journal of Clinical Nutrition* 2018, 72(6), 861–870.

Houghton SC, Manson JE, Whitcomb BW, Hankinson SE, Troy LM, Bigelow C, Bertone-Johnson ER. Protein intake and the risk of premenstrual syndrome. *Public Health Nutrition* 2019, 22(10), 1762–1769.

Hsiao MC, Hsiao CC, Liu CY. Premenstrual symptoms and premenstrual exacerbation in patients with psychiatric disorders. *Psychiatry and Clinical Neurosciences* 2004, 58, 186–190.

ICM (2017) International Confederation of Midwives. International definition of a midwife. <https://www.internationalmidwives.org/our-work/policy-and-practice/icm-definitions.html> (06/07/020).

Karaçam Z, Eroğlu K. Hemşirelik ve Ebelik: Görev, Yetki ve Sorumluluklardaki Benzerlik ve Farklılıklar. *Lokman Hekim Dergisi* 2019, 9 (2), 211-227.

Kroll-Desrosiers AR, Ronnenberg AG, Zagarins SE, Houghton SC, Takashima-Uebelhoeer BB, Bertone-Johnson ER. Recreational Physical Activity and Premenstrual Syndrome in Young Adult Women: A Cross-Sectional Study. *PLoS ONE* 2017, 12(1).

Malik R, Bhat MDA. The management of Premenstrual syndrome: A review. *Bangladesh Journal of Medical Science* 2018. 17(1), 16-20.

McCool WF, Durain D. Common diagnosis in women’s gynaecological health. In Varney H, Burst HV, Kriebs JM, Gegor CL (eds), Varney’s Midwifery (4), Jones & Bartlett Learning, 2004, 379 – 437.

Medic G, Wille M, Hemels MEH. Short- and long-term health consequences of sleep disruption. *Nature and Science of Sleep*, 2017;9 151–161.

Mohamadirizi S, Kordi M. The relationship between food frequency and menstrual distress in high school females. *Iran Journal of Nursing and Midwifery Research* 2015, 20(6), 689–693.

Munishwar D, Mishra B. Benefits of yoga in premenstrual syndrome- a critical review. *National Journal of Research in Ayurved Science* 2019, 7(1), 1-5.

Muñoz CX, Johnson EC, McKenzie AL, Guelinckx I, Graverholt G, Casa DJ, Maresh CM, Armstrong LE. Habitual total water intake and dimensions of mood in healthy young women. *Appetite* 2015, 92, 81–86.

Nworie KM. Premenstrual syndrome: etiology, diagnosis and treatment. A mini literature review. *Journal of Obstetrics and Gynecological Investigations* 2018, 1, 41–46.

Nworie KM, Aluh DO, Onyekwum CA. Assessment of premenstrual syndrome among female students in Southeast Nigeria. *J Obstet Gynecol Investig* 2018, 1, 55–61.

O'Brien PM, Bäckström T, Brown C, Dennerstein L, Endicott J, Epperson CN, Eriksson E, Freeman E, Halbreich U, Ismail KMK, Panay N, Pearlstein T, Rapkin A, Reid R, Schmidt P, Steiner M, Studd J, Yonkers K. Towards a consensus on diagnostic criteria, measurement and trial design of the premenstrual disorders: the ISPMO Montreal consensus. *Arch Women's Mental Health* 2011, 14, 13-21.

Olson BR, Forman, MR Lanza E, McAdam PA, Beecher G, Kimzey LM, Campbell WS, Raymond EG, Brentzel SL, Guttsches-Ebeling B. Relation between Sodium Balance and Menstrual Cycle Symptoms in Normal Women. *Annals of Internal Medicine* 1996, 125 564-567.

Oraby FA, Fawaz MA, El-Sharkawy NB. Reproductive and demographic Predictors' of premenstrual syndrome severity among university students. *Journal of Nursing and Health Science* 2016, 5(5), 10-19.

Oral E, Kirkan TS, Yazici E, Gulec M, Cansever Z, Aydin N. Premenstrual Symptom Severity, Dysmenorrhea, and School Performance in Medical Students. *Journal of Mood Disorders* 2012, 2(4), 143-152.

Perry M, Judge M, Millar D, McDonald D. An exploratory pilot of factors associated with premenstrual syndrome in minority women. *International Journal of Nursing Sciences* 2015, 2, 118-122.

Pinar A, Öncel S. 15-49 Yaş Grubu Kadınlarda Premenstrual Sendrom Görülme Sıklığı (Antalya/Türkiye). *Türkiye Klinikleri Journal of Gynecology and Obstetrics* 2011, 21(4), 227-37.

Purdue-Smithe AC, Manson JE, Hankinson SE, Bertone-Johnson ER. A prospective study of caffeine and coffee intake and premenstrual syndrome. *American Journal of Clinical Nutrition* 2016. 104, 499–507.

Rad M, Sabzevary MT, Dehnavi ZM. Factors associated with premenstrual syndrome in Female High School Students. *Journal of Education and Health Promotion* 2018, 7, 64.

Richardson JTE. Premenstrual syndrome: A brief history. *Social Science and Medicine* 1995, 41(6), 761-767.

Rupa Vani K, Veena KS, Subitha L, Hemanth kumar VR, Bupathy A. Menstrual Abnormalities in School Going Girls – Are They Related to Dietary and Exercise Pattern? *Journal of Clinical and Diagnostic Research* 2013, 7(11), 2537-2540.

Rupani NP, Lema VM. Premenstrual Tension among Nurses in Nairobi, Kenya. *East African Medical Journal* 1993, 70(5), 310-313.

Salomon K. Stress. In: Gellman M.D., Turner J.R. (eds) *Encyclopedia of Behavioral Medicine*. Springer, New York, 2013.

Seedhom AE, Mohammed ES, Mahfouz EM. Life Style Factors Associated with Premenstrual Syndrome among El-Minia University Students, Egypt. *Hindawi Publishing Corporation* 2013.

Selçuk KT, Avcı D, Yılmaz FA. Hemşirelik Öğrencilerinde Premenstrual Sendrom Prevalansı ve Etkileyen Etmenler. *Psikiyatri Hemşireliği Dergisi* 2014, 5(2), 98-103.

Sut HK, Mestogullari E. Effect of Premenstrual Syndrome on Work-Related Quality of Life in Turkish Nurses. <http://dx.doi.org/10.1016/j.shaw.2015.09.001> (09/05/2019).

Tsai SY. Effect of Yoga Exercise on Premenstrual Symptoms among Female Employees in Taiwan. *International Journal of Environmental Research and Public Health* 2016, 13, 721-731.

Tschudin S, Berteau PC, Zemp E. Prevalence and predictors of premenstrual syndrome and premenstrual dysphoric disorder in a population-based sample. *Arch Women's Mental Health* 2010, 13, 485–494.

USDA (2020a). U.S. Department of Agriculture <https://fdc.nal.usda.gov/fdc-app.html#/food-details/782116/nutrients> (03.07.2020).

USDA (2020b). U.S. Department of Agriculture. <https://fdc.nal.usda.gov/fdc-app.html#/food-details/173086/nutrients> (03.07.2020).

Victor FF, Sousa AI, Barreiros CDT, Nunes de Barros JL, Carvalho da Silva FA, Ferreira ALCG. Quality of Life among University Students with Premenstrual Syndrome. *The Brazilian Journal of Gynecology and Obstetrics* 2019, 41(5), 312–331.

Wang J, Geng L. Effects of Socioeconomic Status on Physical and Psychological Health: Lifestyle as a Mediator. *International Journal of Environmental Resource and Public Health* 2019, 16, 281-289.

WHO (2019a). ICD-11 for Mortality and Morbidity Statistics. <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/375471908> (03.07.2020).

WHO (2019b). ICD-11 for Mortality and Morbidity Statistics. <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/1703914672> (03.07.2020).

WHO (2019c). ICD-11 for Mortality and Morbidity Statistics. <https://icd.who.int/browse11/l-m/en#/http://id.who.int/icd/entity/1526774088> (03.07.2020).

Yamamoto K, Okazaki A, Sakamoto Y, Funatsu M. The Relationship between Premenstrual Symptoms, Menstrual Pain, Irregular Menstrual Cycles, and Psychosocial Stress among Japanese College Students. *Journal of Physiological Anthropology* 2009, 129-136.

Yilmaz-Akyuz E, Aydin-Kartal A. The effect of diet and aerobic exercise on Premenstrual Syndrome: Randomized controlled trial. *The Revista de Nutrição*, 2019, 32.



ANNEX 1

(Olgu Rapor Formu/Veri Takip Raporu). (Form 9)

“Bu araştırmaya katılım gönüllük esasına dayanmaktadır. Sorulara verdiğiniz yanıtlar tamamen gizli tutulacaktır. Bu çalışmaya isteyerek katılmanız, bu alanda yapılan bilimsel çalışmaların geliştirilebilmesi için önemli bir etkiye sahiptir. Bu araştırma ile ilgili sormak istediğiniz tüm soruları uygulamayı yürüten (adı, soyadı, iletişim bilgileri –tel (cep), e-posta) uygulama sırasında veya sonrasında e-posta yoluyla veya telefonla (cep) sorabilirsiniz.”

Anketi cevaplama süreniz yaklaşık olarak 15-20 dakika olabilir.)

SOSYO- DEMOGRAFİK ÖZELLİKLER

1. Kaç yaşındasınız?

2. Boyunuz:cm

3. Kilonuz:kg

4. Kaçınıcı sınıfta öğrenim görüyorsunuz?..... sınıf

5. Gelir getiren bir işte çalışıyor musunuz?

- a. Evet
- b. Hayır

6. Gelir-giderinizi karşılaştırdığınızda şu anki ekonomik durumunuzu nasıl değerlendiriyorsunuz?

- a. Gelirimiz giderden fazla
- b. Gelirimiz gidere eşit
- c. Gelirimiz giderden az

7. Sağlık güvenceniz var mı ?

- a. Evet
- b. Hayır

8. Aile tipiniz nedir?

- a. Çekirdek Aile
- b. Geniş Aile
- c. Parçalanmış Aile

9. En uzun yaşadığınız yer neresidir?

- a. İl
- b. İlçe
- c. Köy/ Kasaba

10. Medeni durumunuz?

- a. Evli
- b. Bekar

ADET İLE İLGİLİ ÖZELLİKLER

11. İlk adet yaşıınız kaç:

12. Kaç günde bir adet olursunuz?.....

13. Adetiniz kaç gün sürer?.....

14. Adetleriniz düzenli mi?

- a. Evet
- b. Hayır

15. Adet döneminiz de ağrı yaşar mısınız?

- a. Evet
- b. Hayır

16. Adet ağrısı için ağrı kesici ilaç kullanır mısınız?

- a.Evet
- b.Hayır

PMS RİSK FAKTÖRLERİ

17. Sigara içiyor musunuz? Cevabınız evetse günde kaç adet içiyorsunuz?

- a. Evet (.....adet/gün)
- b. Hayır

18. Alkol kullanıyor musunuz? Cevabınız evetse hangi sıklıkta olduğunu yazınız.

- a. Evet (.....kez/hafta)

- b. Hayır

19. Fiziksel egzersiz yapar mısınız?. Cevabınız evetse ne egzersiz olduğunu ve hangi sıklıkta olduğunu yazınız.

- a. Evet (.....,kez/hafta)
- b. Hayır

20. Yoga ve/veya meditasyon yapar mısınız?. Cevabınız evetse hangi sıklıkta olduğunu yazınız.

- a. Evet (.....kez/hafta)

- b. Hayır

21. Ne sıklıkta kahve (neskafe/türk kahvesi) tüketirsiniz?

.....fincan/gün

22. Ne sıklıkta çay tüketirsiniz?bardak/gün

23. Yemeğin tadına bakmadan tuz kullanır mısınız?

- a. Evet
- b. Hayır

24. Annenizde veya kız kardeşinizde adet öncesi şikayetler olur mu?

- a. Evet
- b. Hayır

25. Öfkenizi kontrol edemediğiniz zamanlar olur mu?

- a. Evet
- b. Hayır

26. Özellikle hangi dönemlerde öfkenizi kontrol edemezsiniz?

- a. Adet öncesi
- b. Adetliken
- c. Adet sonrası
- d. Diğer (.....)

27. Genelde stresli hissediyor musunuz?

- a. Evet
- b. Hayır

**28. Adet ile ilgili herhangi rahatsızlık yaşamınızdaki hangi alan/alanlarda sizi etkiler?
(Birden fazla seçenek işaretleyebilirsiniz)**

- a. Akademik alanda (eğitim ve okul hayatı)
- b. Sosyal alanda (arkadaş ve sosyal çevre ilişkileri, arkadaşlarla gezme, eğlenme)
- c. İşyerinde
- d. Aile/ev hayatında

29. Kronik hastalığınız var mı? Cevabınız evet ise ne olduğunu yazınız.

- a. Evet (.....)
- b. Hayır

30. Devamlı kullandığınız bir ilaç var mı? Cevabınız evet ise ne kullandığınızı yazınız.

- a. Evet (.....)
- b. Hayır

31. Doğum kontrol yöntemi kullanıyor musunuz? Cevabınız evet ise hangi yöntemi yazınız.

a.Evet (.....)

b.Hayır

32. Vitamin ve mineral desteği alıyor musunuz? Alıyorsanız hangi preparatı kullanıyorsunuz, adını, dozunu ve sıklığını yazınız.

a. Evet (.....)

b. Hayır

33. Uyku düzeniniz nasıl?

a. Düzenli uyurum

b. Düzenli uyuyamıyorum

34. Günde ne kadar su içiyorsunuz?su bardağı/gün

35. Hangi suyu içiyorsunuz? (Birden fazla seçenek işaretleyebilirsiniz)

a. Şehir şebeke suyu

b. Ticari olarak satılan doğal kaynak suları

c. Mineralli su

d. Arıtma cihazı ile elde edilen su

36.Aşağıdaki tabloyu beslenme alışkanlıklarınıza göre doldurunuz.

	Hiçbir zaman tüketmem	Ayda 1-2 kez tüketirim	Haftada 1-2 kez tüketirim	Günde en az bir kez tüketirim
Süt ve süt ürünleri (peynir çeşitleri, tereyağı, yoğurt, ayran vs.)				
Kırmızı et				
Beyaz et (tavuk, hindi, vs)				
Su ürünleri (balık, kalamar, karides, yengeç, ahtapot vs.)				
Sebze ve meyve				
Fast-food (hamburger, cheeseburger, sandviç, patates cipsi vs.)				
Salam, sucuk, sosis				
Hamur işleri (makarna, pasta, börek, poğaç, kurabiye)				
Tatlı (sütlü, şerbetli tatlılar, dondurma)				
Gazlı ve/veya şekerli içecekler				

ANNEX 2

PREMENSTRÜEL SENDROM ÖLÇEĞİ

Aşağıda bazı tanımlayıcı cümleler vardır. Her bir cümleyi dikkatlice okuyunuz. Sonra bu durumun sizde **ADET OLMANIZA BİR HAFTA KALA olma** durumunu cümlelerin sağındaki ölçeği dikkate alarak işaretleyiniz. Daha öncesi veya daha sonrası bu durumların var olup olmasını değerlendirmeyiniz **Hiçbir soruyu boş bırakmayınız.**

	Hiç	Çok az	Bazen	Sık	Sürekli
1. Kendimi üzgün hissediyorum					
2. İçimden ağlamak geliyor					
3. Canım sıkılıyor					
4. Kendimi bezgin hissediyorum					
5. Hiçbir şey zevk vermiyor					
6. Her şey üzerime geliyor					
7. Karamsar oluyorum					
8. Derin nefes almak istiyorum					
9. Her an kötü bir şey olacakmış gibi korkuyorum					
10. Seslere karşı hassasiyetim artıyor					
11. Arkamdan biri saldıracakmış gibi korkuyorum					
12. Kendimi yorgun hissediyorum					
13. Sanki her şey kötü olacak					
14. Çok çabuk yoruluyorum					
15. Anlam veremediğim korkularım oluyor					
16. Kalbim her zamankinden hızlı çarpıyor					
17. Hiçbir şeyle uğraşmak istemiyorum					
18. Her zamanki işler beni yoruyor					
19. Kendimi sinirli hissediyorum					
20. En ufak olaylara bile çok aşırı tepki gösteriyorum					
21. Öfkemi kontrol etmekte güçlük çekiyorum					
22. Çevremdeki kişilerle ilişkilerim bozuluyor					
23. Sinirlerim geriliyor					
24. Kendimi çok endişeli					

hissediyorum					
25. Eskisinden daha çabuk yoruluyorum					
26. Kendimi değersiz görüyorum					
27. Dikkatimi toplamakta güçlük çekiyorum					
28. Dikkatim çok çabuk dağılıyor					
29. Dalıp gidiyorum					
30. Doğru düzgün düşünemiyorum					
31. Baş ağrısı oluyor					
32. Kaslarım ağrıyor					
33. Eklem yerlerim ağrıyor					
34. İştahım artıyor					
35. Özellikle unlu ve tatlı yiyecekler yemek istiyorum					
36. Daha fazla yemek yiyorum					
37. Uyku uyuma isteğim artıyor					
38. Uykumda bölünme oluyor					
39. Sabahları yorgun uyanıyorum					
40. Uykuya dalmakta güçlük çekiyorum					
41. Göğüslerim şişiyor					
42. Göğüslerim en ufak dokunmaya karşı çok duyarlı					
43. Kendimi şişmiş hissediyorum					
44. Kimseyle görüşmek istemiyorum					