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# Premenstrual Syndrome and Associated Factors among Students in Secondary Schools in Arba Minch Town, Southern Ethiopia: A Cross-Sectional Study, 2021

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## Abstract

*Background*

Many women feel physical or mood changes in the days before menstruation. Previous studies in other areas of Ethiopia have not looked at factors that could be related to the premenstrual syndrome. As a result, this study aims to fill these gaps by determining the prevalence and behavioral, reproductive, and menstrual factors that affect premenstrual syndrome in Arba Minch town.

*Methods*

An institution-based cross-sectional survey was conducted in Arba Minch town from April 1 to April 25, 2021. Participants were chosen using computerized simple random selection from a list of female students' registration numbers that had been transformed into unique codes. SPSS for Windows version 25.0 was used to analyze and interpret the data. Bivariate analysis was used to fit variables with a P-value of less than 0.2 for multivariable analysis. In multivariable logistic regression, variables with a P-value less than 0.05 are considered statistically significant.

*Result*

This study has revealed that 59.8% (95% CI: 55.8%–63.8%) of students have premenstrual syndrome. Dysmenorrhea (AOR = 3.172, 95% CI: 2.032, 4.952), family history of PMS (AOR = 3.155, 95% CI: 2.119, 4.697), normal body mass index (AOR = 0.244, 95% CI: 0.161, 0.37), and overweight (AOR = 3.739, 95% CI: 1.763, 7.931) were significantly associated with premenstrual syndrome. This study has revealed that 59.8% (95% CI: 55.8%–63.8%) of students have premenstrual syndrome. Dysmenorrhea (AOR = 3.172, 95% CI: 2.032, 4.952), family history of PMS (AOR = 3.155, 95% CI: 2.119, 4.697), normal body mass index (AOR

= 0.244, 95% CI: 0.161, 0.37), and overweight (AOR = 3.739, 95% CI: 1.763, 7.931) were significantly associated with premenstrual syndrome.

*Conclusion*

Six out of ten Arba Minch town secondary school students had premenstrual syndrome. Dysmenorrhea, a family history of premenstrual syndrome, and body mass index were found to be significantly associated.

**Introduction**

Menstrual health is fundamental to adolescent reproductive health (1). Many women feel physical or mood changes during the days before menstruation. When these symptoms happen month after month and affect a woman's normal life, they are known as premenstrual syndrome (PMS) (1).

Manifestations may vary from month to month, although they manage to form a pattern over time (2). Every woman's manifestations are different, but the most frequent include: feeling upset, anxious, or emotional; feeling depressed, irritable, or bad-tempered; mood swings; changes in appetite and food cravings; headaches; tiredness or having trouble sleeping; abdominal bloating; acne; sore or tender breasts; fluid retention; and feeling bloated (3).

PMS significantly influenced daily activities related to quality of life and homework. Moreover, almost half of the female students experienced the effects of menstruation in their learning environment (4).

In Asia, the prevalence of PMS was 46%. About 47.7% of Pakistanis suffer from PMS. In West Bengal and India more than half of the 65% of girls have PMS and about 55.3% of them have faced social rejection due to this syndrome (5). Women in Gujarat, however, have moderate-to-severe PMS symptoms only 18.4% of the time (6).

In Africa, the prevalence is very high; about 85% of women are affected by premenstrual syndrome (7). In Nigeria, the prevalence of PMS was 40.7%, with stomach discomfort being the most common symptom (70.6%) (8). In Egypt, 86.3% of women had experienced PMS symptoms, and from this, 53.3% of those students missed at least one school activity (9); in Eritrea, it was only 17.5%, and the most frequent symptoms were upper thigh pain, abdominal bloating, irritability, and breast tenderness (10).

According to some studies, the prevalence of PMS in Ethiopian women is 86.1%, 41.12%, and 18%, respectively, in Addis Ketema, Debre Birhan, and Ambo. Different areas reported abdominal bloating, abdominal cramps, a decreased interest in daily activity, and a depressed mood during the premenstrual period. Some of these symptoms are severe enough to affect students' daily activities (11–14).

The studies carried out previously in other regions of Ethiopia did not evaluate potential PMS risk factors, so in these studies sleeping problems, advice about menstruation before menstruation began, not living with family, and estimating the amount of time spent walking to school will all be assessed for their association with PMS. To our best knowledge, there have been no research in the study area. Therefore, the primary goal of this work is to close these gaps by determining the prevalence and the sociodemographic, behavioral, reproductive, and menstrual-related factors contributing to a premenstrual syndrome in Arba Minch town.

***Methods and materials***

*Study area and period*

The study was conducted in Arba Minch town, Ethiopia, from April 1 to 25, 2021. Arba Minch Town is found in the Southern Nations, Nationalities, and Peoples regional state of Ethiopia. It is situated 505

kilometers south of Addis Ababa in the Gamo zone. One of Ethiopia's towns, 118,040 people call it home overall (with 58784 males and 59256 females). In Arba Minch town, there are seven secondary schools. There are 6911 secondary school students from them 3390 are male and 3521 are female.

*Study Design*

An institution based cross-sectional study was used.

*Source Population*

All secondary school female students in Arba Minch town.

*Study Population*

Female students in randomly selected secondary school in Arba Minch town during the study period.

*Inclusion criteria*

Female students who present in the school on the day of the administration of the questionnaire were included.

*Exclusion criteria*

Participants were excluded if they had histories of medical problems including known hypertension, diabetes mellitus, asthma and migraine headache.

*Sample size determination*

The sample size was determined using a single population proportion formula, with the following assumptions: a p-value of 41.12 percent was taken from the study of Debrebirhan (12), a 95 percent confidence level, a 4 percent margin of error, and a 10 percent non-response rate. The final sample size was 639.

*Sampling technique*

The sampling procedure started by identifying secondary schools in Arba Minch town and three schools were selected by simple random sampling method from seven secondary schools. Six hundred thirty-nine respondents were selected with computerized simple random sampling method from a list of students' names. The sample sizes for each school were allocated by using proportional allocation formula. Three hundred sixty six students from Arba Minch secondary school, 185 students from Chamo secondary school, and 88 students from Future Hope secondary school were included.

*Operational definitions*

*Premenstrual syndrome*

Participants who have at least one somatic symptom (breast tenderness, headache, bloating, discomfort, nauseousness, vomiting, diarrhea, and muscle/joint/back pain) and 1 affective (hypersomnia, insomnia, angry outbursts, anxiety, irritability, hopelessness, depression, difficulty concentrating, lethargy/fatigue/decreased energy and social withdrawal occurring 1 week or less before menses (15–17).

*Amount of menstrual flow*

Based on the sanitary pad they change per day. Periods were considered regular if a woman changed five or more sanitary napkins per day and sparse if she changed one or less. and heavy if >=8 pads/day (18).

*Non-academic duty*

Schoolgirls who had no responsibilities at household or elsewhere were categorized as "not at all"; those who engaged in household chores like cleaning, making coffee, making beds, and washing their own

clothes were placed in the "simple" category; contrasted with, those who engaged in daily labor like farming, marketing, and cooking were placed in the "heavy" group (13).

*Study variables*

*Dependent variable*

Premenstrual syndrome

*Independent variable*

Socio-demographic factors, reproductive and menstruation related factors, and life style behavioral factors

*Data collection method*

*Data collection instrument and procedure*

Data were collected with a self-administered semi-structured questionnaire. From a prior study, we adapted a semi-structured English version questionnaire from different research studies (10,12,14,18,19).The questionnaire consists of 4 sections with a total of 34 quantitative items. Section I was designed to collect data on the socio-demographic factors, Section II was designed to collect data on the life style behavioral factors, Section III was designed to collect information about the reproductive and menstrual-related factors, and Section IV was designed to collect information about the anthropometric measurements of the participant. After communicating with the student's family and teachers, the students complete the questionnaire after they finish their class before going home, and it takes < 30 minutes. The height and weight of the study participants were measured with a tape meter and weighing scale.

*Data collectors*

Three BSc Nurses used as facilitators and they received instruction on the tools for data collection and sampling procedures.

*Data quality assurance*

Before the actual data collection period, testing of questionnaires conducted on 5% of the total samples in Merab Abaya secondary school.

Before the study participants stepped onto the weighing scale, the scales were at zero and they were requested to take out any "heavy" objects from their pockets, such as their wallets and keys, as well as any bulky clothing or accessories (big jackets, shoes, etc.). The study participant was instructed to look straight ahead and remain while being weighed. Before taking the measurement, let the needle or digital display settle. Participants removed their shoes before taking the measurement and height was measured with a tape meter to the closest centimeter.

The scale was checked for accuracy daily before starting measurement and after completing the questionnaire, study participants had their height and weight measured. Then BMI calculated with [weight (kg)/ height (m2)]. Participants were given brief descriptions of the study before they began filling out the questionnaires by the facilitators. Throughout the data collection period, supervision was regularly held, and daily uniformity and completeness checks were made on the data.

*Data processing and analysis of data*

Epi data 3.1 was used to enter the data, and SPSS for Windows version 25.0 was used to analyze it. There were multivariable logistic regression analyses, descriptive statistics, and bivariate analysis. To

determine the relationship between each independent variable and the dependent variable, bivariate analysis was used. Variables are taken into account for multivariate analysis when the bivariate P-value is less than 0.2. In a multivariable logistic regression analysis, the adjusted odds ratio and 95 percent confidence interval (CI) were utilized to determine the variables related to premenstrual syndrome. The level of statistical significance was set at a p-value of 0.05 for all two-sided tests. To assess for multicollinearity, the independent variables' linear correlation was examined. Hosmer-goodness-of-fit Lemeshow's test model evaluated the model's fitness. Frequency, percentage, and mean were employed in the descriptive data analysis, and tables and graphs were used to illustrate the results.

**Ethical consideration**

Ethical clearance was obtained from the AMU College of Medicine and Health Science, institutional research ethics board with the reference number of RB/1070/21. The research was conducted after proper information was given to students and their teachers, written informed consent to participate in this study was provided by the participant's parents or legal guardian/next of kin before the data collection period and their confidentiality was ensured by avoiding personal identifiers such as names from questionnaires.

**Results**

*Socio-demographic characteristics of study participants*

In this study, about 639 high school students participated, and the response rate was 100%. More than sixty percent (61.9%) were Gamo in ethnicity, and 300 (46.9%) were orthodox in religion. The mean age and standard deviation of respondents were 17.1±2 years (Table 1).

Table 1. Socio-demographic characteristics of secondary school students, Arba Minch town, Southern Ethiopia, 2021

| Variables | | Frequency | Percent (%) |
|---|---|---|---|
| Ethnicity | Gamo | 390 | 61.0% |
| | Gofa | 61 | 9.5% |
| | Wolayita | 99 | 15.5% |
| | Amhara | 31 | 4.9% |
| | Oromo | 26 | 4.1% |
| | Others (Konso, Gedio, Hadya, and Silta) | 32 | 5.0% |
| Religion | Orthodox | 300 | 46.9% |
| | Protestant | 209 | 32.8% |
| | Muslim | 90 | 14% |
| | Others(Catholic, jova, and Adventist) | 40 | 6.3% |
| Age | 13-15 | 82 | 12.8% |
| | 16-18 | 488 | 76.4% |
| | >=19 | 69 | 10.8% |
| Family status | Living together | 496 | 77.6% |
| | Divorced | 82 | 12.8% |
| | One of them is dead | 52 | 8.1% |
| | Both are dead | 9 | 1.4% |

| Variables | | Frequency | Percent (%) |
|---|---|---|---|
| Family member | <4 | 82 | 12.8% |
| | 4-7 | 400 | 62.6% |
| | >7 | 157 | 24.6% |
| Living status | With parents | 442 | 69.2% |
| | Away from parents | 197 | 30.8% |
| Education status of the mother | Not educated | 129 | 20.2% |
| | Primary school (grade 1-8) | 203 | 31.8% |
| | Secondary school (grade 9-12) | 128 | 20.0% |
| | Higher education | 179 | 28.0% |
| Education status of the father | Not educated | 64 | 10.0% |
| | Primary education (grade 1-8) | 158 | 24.7% |
| | Secondary education (grade 9-12) | 140 | 21.9% |
| | Higher education | 277 | 43.3% |
| Occupation status of the mother | Housewife | 348 | 54.5% |
| | Employed | 291 | 45.5% |
| Occupation status of the father | Unemployed | 26 | 4.06% |
| | Employed | 613 | 95.9% |
| The family income per month | <=1000 ETB | 11 | 1.7% |
| | 1001-2000 ETB | 59 | 9.2% |
| | 2001-3999 ETB | 213 | 33.3% |
| | >=4000 ETB | 356 | 55.7% |
| Non-academic duty | Not at all | 124 | 19.4% |
| | Simple | 443 | 69.3% |
| | Heavy | 72 | 11.3% |

*Lifestyle behavior characteristics of study participants*

Among 639 respondents, 297 (46.5%) do physical exercise irregularly. Three hundred fifty-one (54.9%) drink coffee and 167 (26.1%) drink 1 cup of coffee per day. The majority of 633 (99.1%) did not smoke a cigarette, and 503 (78.7%) did not have sleeping problems. More than half (52.4%) of students spent <30 minutes walking to school. (Table 2)

*Reproductive and menstrual-related characteristics*

The majority, 446 (69.8%) of respondents' menarche age was between 13 and 15 years, the mean menarche age and standard deviation of respondents were 10.8±6 and 511 (80.0%) had a normal menstrual cycle range of 21-35 days, and for 331 (51.8%) of them, their menses lasted for 4-5 days. Nearly three-quarters (478, (74.8%) have light (<=4 pads/day) menstrual bleeding. Of 639 respondents, 436 (68.2%) had advice about menstruation before menses. Only 93 (14.6%) use contraceptives. Four hundred forty-nine (70.3%) do not have pain during menses, and 383 (59.9%) have a family history of premenstrual syndrome (Table 3).

Table 2. Lifestyle behavior of secondary school students, Arba Minch town, Southern Ethiopia, 2021

| Variables | | Frequency | Percent (%) |
|---|---|---|---|
| Physical exercise | Not at all | 287 | 44.9% |
| | <1hr/week | 297 | 46.5% |
| | 1-3hr/week | 55 | 8.6% |
| Drink coffee | Yes | 351 | 54.9% |
| | No | 288 | 45.1% |
| Coffee per day/cup | 1 | 167 | 47.5% |
| | 2-3 | 144 | 41.02% |
| | >=3 | 40 | 11.3% |
| Smoke cigarette | Yes | 6 | 0.9% |
| | No | 633 | 99.1% |
| Cigarette smoking per day | 1-14 | 6 | 100% |
| | 15-24 | 0 | 0% |
| | >24 | 0 | 0% |
| Sleeping problem | Yes | 136 | 21.3% |
| | No | 503 | 78.7% |
| Estimate an hour spent walking to school | <30 min | 335 | 52.4% |
| | 30-60 min | 262 | 41% |
| | >=60 | 42 | 6.6% |
| Body mass index | Underweight | 180 | 28.2% |
| | Normal weight | 349 | 54.6% |
| | Overweight | 110 | 17.2% |

Table 3. Reproductive and menstrual-related characteristics of secondary school students, Arba Minch town, Southern Ethiopia, 2021.

| Variables | | Frequency | Percent (%) |
|---|---|---|---|
| Age at menarche | <13 | 156 | 24.4% |
| | 13-15 | 446 | 69.8% |
| | 16-18 | 37 | 5.8% |
| Advice about menstrua-tion before menses | Yes | 436 | 68.2% |
| | No | 203 | 31.8% |
| Menstrual cycle | <21 day | 73 | 11.4% |
| | 21-35 day | 511 | 80.0% |
| | >35 day | 55 | 8.6% |

| Variables | | Frequency | Percent (%) |
|---|---|---|---|
| Menstrual duration | 1-3 day | 208 | 32.6% |
| | 4-5 day | 331 | 51.8% |
| | 6-8 day | 88 | 13.8% |
| | >8 day | 12 | 1.9% |
| Amount of menstrual bleeding | Light (<=4 pads/day) | 478 | 74.8% |
| | Normal(5-7pads/day) | 101 | 15.8% |
| | Heavy(>=8 pads/day) | 60 | 9.4% |
| Contraceptive use | Yes | 93 | 14.6% |
| | No | 546 | 85.4% |
| Pain during menses | Yes | 190 | 29.7% |
| | No | 449 | 70.3% |
| Family history of pre-menstrual syndrome (mother and sister) | Yes | 383 | 59.9% |
| | No | 256 | 40.1% |

The most-reported premenstrual symptom from somatic was 250 (97.2%) lethargy/fatigue/decreased energy, and from affective, 116 (45.1%). Hypersomnia was the most reported symptom (Figure 1 & 2).

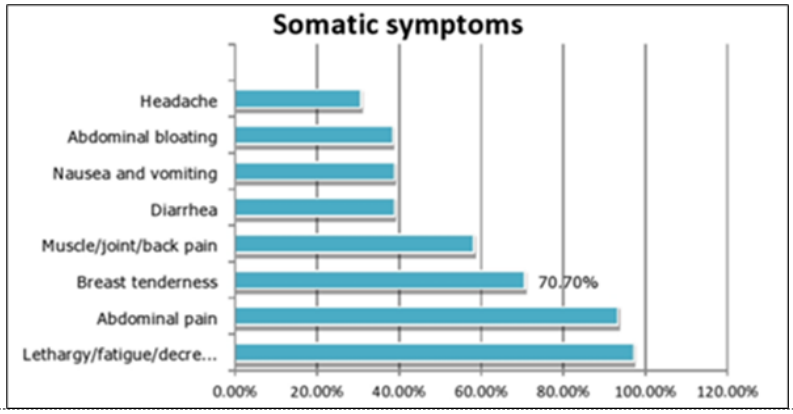


Figure 1. Somatic symptoms among secondary school students, Arba Minch town, Southern Ethiopia, 2021.

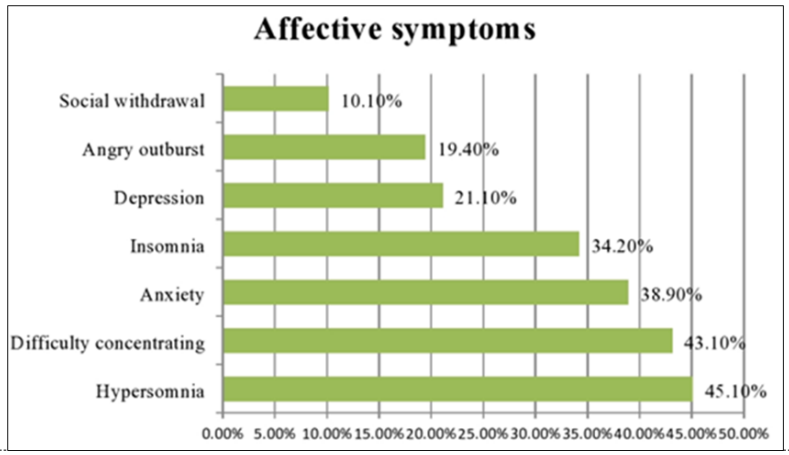


Figure 2. Affective symptoms among secondary school students, Arba Minch town, Southern Ethiopia, 2021.

*Factors associated with premenstrual syndrome*

In bivariate logistic analysis, living status, family member, father's educational status, mother's occupational status, age of the first menstrual period (menarche), duration of menstrual flow, contraceptive use, pain during menses, family history of PMS, and body mass index were significantly associated with PMS with a p-value of < 0.2. Pain during menstruation (AOR = 3.172, 95%CI: 2.032, 4.952), family history of PMS (AOR = 3.155, 95%CI: 2.119, 4.697), normal body mass index (AOR = 0.244, 95%CI: 0.161, 0.37), and overweight (AOR = 3.739, 95%CI: 1.763, 7.931) were variables that were significantly associated with PMS with a P-value 0.05 (Table 4).

Table 4. Factors associated with PMS in bivariate and multivariate analysis among secondary school students, Arba Minch town, Southern Ethiopia, 2021.

| Variable | PMS (N=639) | | COR (95% C.I.) | AOR (95% C.I.) | P-value |
|---|---|---|---|---|---|
| | Yes | No | | | |
| **Living status** | | | | | |
| With parents | 255(57.7%) | 187(40.3%) | 1.00 | 1.00 | |
| Far from parents | 127(64.5%) | 70(35.5%) | 1.33(0.94-1.883) | 1.202 (0.797-1.812) | 0.380 |
| **Family member** | | | | | |
| <4 | 42(51.2%) | 40(48.7%) | 1.00 | 1.00 | |
| 4-7 | 240(60%) | 160(40%) | 1.429(0.887-2.302) | 1.326(0.744-2.363) | 0.339 |
| >7 | 100(63.7%) | 57(36.3%) | 1.671(0.972-2.872) | 1.65(0.876-3.107) | 0.121 |
| **Education status of the father** | | | | | |
| Not educated | 40(62.5%) | 24(37.5%) | 1.00 | 1.00 | |
| Primary school (1-8) | 98(62.1%) | 60(37.9%) | 0.98(0.538-1.785) | 1.349(0.681-2.673) | 0.391 |
| Secondary school (9-12) | 94(71.4%) | 46(28.5%) | 1.226(0.662-2.272) | 1.267(0.63-2.549) | 0.506 |
| Higher education | 150(54.2%) | 127(45.8%) | 0.709(0.405-1.239) | 0.832(0.44-1.57) | 0.57 |
| **Occupation status of the mother** | | | | | |
| Housewife | 218(62.7%) | 130(37.3%) | 1.299 (0.945-1.784) | 1.183(0.812-1.724) | 0.380 |
| Employed | 164(56.3%) | 127(43.6%) | 1.00 | 1.00 | |
| **Age at menarche** | | | | | |
| <13 | 86(55.2%) | 70(44.8%) | 0.52 (0.24-1.125) | 0.527(0.223-1.243) | 0.144 |
| 13-15 | 270(60.5%) | 176(39.5%) | 0.649 (0.313-1.347) | 0.662(0.296-1.482) | 0.316 |
| 16-18 | 26(70.3%) | 11(29.7%) | 1.00 | 1.00 | |

| Variable | PMS (N=639) | | COR (95% C.I.) | AOR (95% C.I.) | P-value |
|---|---|---|---|---|---|
| | Yes | No | | | |
| **Menstrual duration** | | | | | |
| 1-3 day | 133(63.9%) | 75(36.1%) | 1.00 | 1.00 | |
| 4-5 day | 200(60.5%) | 131(39.5%) | 0.861(0.601-1.232) | 0.958(0.63-1.456) | 0.841 |
| 6-8 day | 42(47.8%) | 46(52.2%) | 0.515(0.311-0.853) | 0.719 (0.392-1.321) | 0.288 |
| >8 day | 7(58.4%) | 5(41.6%) | 0.789(0.242-2.574) | 0.925 (0.243-3.523) | 0.909 |
| **Contraceptive use** | | | | | |
| Yes | 48(51.7%) | 45(48.3%) | 1.00 | 1.00 | |
| No | 334(61.2%) | 212(38.8%) | 1.477 (0.95-2.297) | 1.543(0.925-2.574) | 0.97 |
| **Pain during menses** | | | | | |
| Yes | 137(72.2%) | 53 (27.8%) | 2.152 (1.49-3.108) | 3.172 (2.032-4.952) | 0.0001* |
| No | 245(54.5%) | 204(45.5%) | 1.00 | 1.00 | |
| **Family history of PMS** | | | | | |
| Yes | 255(66.5%) | 128(33.4%) | 2.024 (1.463-2.798) | 3.155 (2.119-4.697) | 0.0001* |
| No | 127(49.7%) | 129(50.3%) | 1.00 | 1.00 | |
| **Body mass index** | | | | | |
| Underweight (<18.5) | 132(73.3%) | 48 (26.6%) | 1.00 | 1.00 | |
| Normal(18.5-24.99) | 150 (43%) | 199 (57%) | 0.274 (0.183-0.401) | 0.244 (0.161-0.37) | 0.0001* |
| Overweight (>24.99) | 100(90.9%) | 10 (9.1%) | 3.636 (1.79-7.686) | 3.739 (1.763-7.931) | 0.001* |

*significantly associated with P-value <0.05, COR=Crude odd ratio

## Discussion

In this study, the magnitude of PMS was 59.8% (95% CI: 55.8%-63.8%), which was consistent with findings from Lebanon (20) and India (5), in which the magnitude was reported to be 63% and 61.5%, respectively. But this result was less than the studies done in Egypt (21), Bahir Dar (18), Debre Markos (13), and Addis Ketema (11), in which the magnitude was reported to be 86.3%, 72.8%, 81.3%, and 86.1%, respectively. This might be due to differences in the living standards, study period, education level, and sample size. However, it is higher than the study done in Debrebirhan (12), Mekelle (22) and Eritrea (10), in which the magnitude is reported to be 41.12%, 37%, and 17.5%, respectively. This discrepancy might be due to the difference in study setting and characteristics of study participants; in the studies done in Mekelle and Eritrea, the study participants were healthy science students, and in the study done in Debrebirhan, the study was community-based.

The findings of these studies revealed that respondents who had dysmenorrhea were 3.172 times more likely to have premenstrual syndrome in comparison with their counterparts (AOR = 3.172, 95% CI: 2.032, 4.952). At Sakarya University, students who have dysmenorrhea are 1.565 times more likely to have PMS (23). This finding was consistent with a study done in Pakistan, where dysmenorrhea had a

significant and independent association with PMS (24). This might be due to fear of the pain that occurs during menses as the time of menstruation approaches and this results in stress, in turn PMS could occur, and it also might have overlapping biochemical etiologies, including the possible role of prostaglandins in both.

In this study, students with a family history of PMS were 3.155 times more likely to have PMS than those who did not have a family history of PMS (AOR = 3.155, 95% CI: 2.119, 4.697). This is consistent with a study done at Bahir Dar University (18), Sakarya University (23), and Egypt (21). This may be because premenstrual syndrome has a hereditary factor. There might also be a psychological impact in that the daughters may react similarly to their mothers or sisters (25). However, in the study done in India, PMS was found to be inversely associated with students with a family history of menstrual problems (26).This might be the difference in the study area, culture, and participant age.

In this study, respondents with normal BMI were 75.6% less likely to have PMS than the underweight (AOR = 0.244, 95% CI: 0.161, 0.37), and those who were overweight were 3.739 times more likely to have PMS than the underweight (AOR = 3.739, 95% CI: 1.763, 7.931). This finding was consistent with a study done in northern Nigeria(8) and Lebanon (20) . This may be due to the lower estradiol levels related to fat that could result in impaired serotonin function and contribute to the prevalence of PMS.

**Conclusions and recommendations**

In the study area, six out of ten secondary school students had PMS. Variables like dysmenorrhea, family history of premenstrual syndrome, and body mass index were factors that were related to the presence of premenstrual syndrome. As a result, identifying its impact on students through various stakeholders such as the ministries of education and health is critical. Health professionals should emphasize creating ways to maintain a normal BMI and counseling on ways to manage/decrease dysmenorrhea to decrease the magnitude of premenstrual syndrome. The school should support the students by forming peer-to-peer support groups and counseling services, and encourage and create an environment for the students to maintain normal BMI and communicate with health professionals, parents, and friends regarding how to have and maintain a normal BMI and ways to manage/decrease dysmenorrhea. The Arbaminch town health department and education bureau may use the findings of this study to decrease the magnitude of PMS by enhancing female students' awareness of maintaining normal BMI ways to alleviate dysmenorrhea. Further studies should focus on the impact or burden of premenstrual syndrome on students' academic performance.

**Abbreviations**

AOR stands for adjacent odd ratio; BM stands for body mass index; PMS stands for premenstrual syndrome; and SPSS stands for Statistical Package for Social Science.

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**Conflicts of interest**

The authors declare that they have no conflicts of interest in this work.

**Availability of data and materials**

All the datasets for this study are available from the principal investigator and corresponding author upon request.

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