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ความชุกและปัจจัยเสี่ยงของอาการปวดประจำเดือนในผู้หญิงวัยรุ่นและผู้ใหญ่วัยเริ่มที่เข้ารับการรักษาในโรงพยาบาล: การศึกษาย้อนหลังแบบมีกลุ่มควบคุม

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Prevalence and Risk Factors of Dysmenorrhea in Adolescent and Young Adult Women: A Hospital-Based Retrospective Case–Control Study

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บทคัดย่อ

หลักการและวัตถุประสงค์: อาการปวดประจำเดือนเป็นภาวะทางนรีเวชที่พบบ่อยและส่งผลกระทบอย่างมีนัยสำคัญต่อคุณภาพชีวิตของผู้หญิง จากข้อมูลความแตกต่างของความชุกในแต่ละกลุ่มอายุและความท้าทายในการแยกสาเหตุของอาการปวดประจำเดือนระหว่างอาการปวดประจำเดือนแบบปฐมภูมิและแบบทุติยภูมิเพื่อตระหนักในภาวะของโรคและช่วยวางแผนในการดูแลรักษา ดังนั้นการศึกษานี้มีวัตถุประสงค์เพื่อประเมินความชุก ปัจจัยเสี่ยงและสาเหตุของอาการปวดประจำเดือนในผู้หญิงวัยรุ่นและผู้ใหญ่วัยเริ่มที่เข้ารับการรักษาที่โรงพยาบาล

วิธีการศึกษา: การศึกษาแบบย้อนหลังระหว่างกลุ่มที่มีอาการปวดประจำเดือนและกลุ่มควบคุมที่เป็นผู้หญิงในวัยเดียวกันที่เข้ารับการรักษาภาวะอื่นๆ ในอัตราส่วน 1 ต่อ 3 ดำเนินการศึกษาที่โรงพยาบาลขอนแก่น ซึ่งเป็นโรงพยาบาลระดับตติยภูมิ โดยทำการเก็บข้อมูลจากเวชระเบียนอิเล็กทรอนิกส์ของผู้ป่วยหญิงอายุ 10-25 ปี ที่เข้ารับการรักษาอาการทางนรีเวชระหว่างวันที่ 1 มกราคม ถึง 31 ธันวาคม พ.ศ. 2567 จำนวนทั้งสิ้น 1,160 ราย และใช้สถิติการถดถอยโลจิสติกเพื่อวิเคราะห์ปัจจัยเสี่ยงที่สัมพันธ์กับอาการปวดประจำเดือน โดยผลการวิเคราะห์ที่มีนัยสำคัญทางสถิติต้องมีค่าน้อยกว่า 0.05

ผลการศึกษา: ความชุกของอาการปวดประจำเดือนในกลุ่มผู้หญิงวัยรุ่นถึงผู้ใหญ่วัยเริ่มอยู่ที่ร้อยละ 10.5 (290/2,752) โดยที่ร้อยละ 73.4 (213/290) ของผู้ป่วยกลุ่มนี้ได้รับการวินิจฉัยว่ามีอาการปวดประจำเดือนแบบปฐมภูมิ ขณะที่ร้อยละ 26.6 (77/290) มีภาวะเยื่อบุโพรงมดลูกเจริญผิดที่ อายุน้อยที่สุดที่เริ่มมีอาการปวดประจำเดือนคืออายุ 12 ปีและภาวะเยื่อบุโพรงมดลูกเจริญผิดที่พบได้ในวัยรุ่นตั้งแต่อายุ 16 ปี นอกจากนี้พบว่ามีผู้ป่วยจำนวน 110 ราย (ร้อยละ 38.7) เป็นนักเรียนซึ่งกำลังศึกษาอยู่ในระดับประถมศึกษาและมัธยมศึกษาจำนวน 75 ราย คิดเป็นร้อยละ 68.2 ของจำนวนผู้ป่วยที่เป็นนักเรียนทั้งหมด ปัจจัยเสี่ยงที่สำคัญของการเกิดอาการปวดประจำเดือน ได้แก่ ไม่เคยคลอดบุตรมาก่อน (AOR = 2.04; ช่วงความเชื่อมั่นที่ 95%: 1.05–3.95; p = 0.034), การสูบบุหรี่ (AOR = 3.67; ช่วงความเชื่อมั่นที่ 95%: 1.28–10.59; p = 0.017), ประจำเดือนมาไม่สม่ำเสมอ (AOR = 1.47; ช่วงความเชื่อมั่นที่ 95%: 1.07–2.00; p = 0.016) และภาวะเลือดประจำเดือนออกมาก (AOR = 3.26; ช่วงความเชื่อมั่นที่ 95%: 1.77–6.01; p < 0.001)

สรุป: การศึกษานี้แสดงข้อมูลความชุก รวมถึงปัจจัยเสี่ยงที่สำคัญของอาการปวดประจำเดือนในผู้หญิงกลุ่มวัยรุ่นและในผู้ใหญ่วัยเริ่มที่เข้ารับการรักษากับแพทย์ ผลการศึกษานี้สนับสนุนความจำเป็นในการจัดการทางคลินิกอย่างตรงจุด และการส่งเสริมให้มีโครงการการให้ความรู้และให้คำปรึกษาด้านสุขภาพของผู้หญิงโดยเฉพาะอย่างยิ่งเกี่ยวกับอาการปวดประจำเดือนในสถานศึกษา

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Abstract

Background and Objective: Dysmenorrhea is a common gynecologic condition that significantly affects women's quality of life. Variations in prevalence across age groups and challenges in distinguishing primary from secondary dysmenorrhea remain concerns, particularly in guiding appropriate management. This study aims to assess the prevalence, risk factors, and underlying causes of dysmenorrhea among individuals in a defined age group seeking care at a hospital.

Methods: A retrospective case-control study (1:3) was conducted at a tertiary hospital by reviewing electronic medical records from January 1 to December 31, 2024. Records of 1,160 patients aged 10–25 with gynecologic conditions were analyzed. Logistic regression was used to identify associated risk factors, with a significance level of 0.05.

Results: Dysmenorrhea prevalence in this age group was 10.5% (290/2,752). Among these cases, 73.4% (213/290) were diagnosed with primary dysmenorrhea, while 26.6% (77/290) had endometriosis. The youngest age of onset was 12 for dysmenorrhea and 16 for endometriosis. Of the affected individuals, 110 (38.7%) were students, with the majority—75 (68.2%)—enrolled in primary and secondary school. Nulliparity (AOR = 2.04; 95% CI: 1.05–3.95; p = 0.034), smoking (AOR = 3.67; 95% CI: 1.28–10.59; p = 0.017), menstrual irregularity (AOR = 1.47; 95% CI: 1.07–2.00; p = 0.016) and heavy menstrual bleeding (AOR = 3.26; 95% CI: 1.77–6.01; p < 0.001) were significant risk factors.

Conclusions: The study highlights the prevalence of dysmenorrhea, as well as key risk factors, among adolescents and young adults. The findings support the need for targeted clinical management and school-based health education and counseling initiatives.

Keyword: dysmenorrhea, adolescent health, young adult, risk factors, prevalence, endometriosis

Introduction

Adolescence and young adulthood are critical developmental periods marked by significant biological, psychological, and social transformations as individuals transition from childhood to adulthood[1]. Adolescents experience substantial physical changes, particularly related to the development of secondary sexual characteristics and fluctuations in sex hormones, which continue to evolve throughout young adulthood[2]. In parallel, ongoing psychological and neurological development during young adulthood plays a crucial role in shaping cognitive, emotional, and behavioral maturity. Consequently, this life phase presents unique healthcare challenges that warrant focused attention[3].

Dysmenorrhea refers to discomfort and pain associated with menstruation[4] and is one of the most common gynecological symptoms among women, affecting approximately 50–90% of adolescent and young adult women[5]. It is classified into two types: primary and secondary dysmenorrhea. Primary dysmenorrhea occurs without an identifiable underlying cause[6], whereas secondary dysmenorrhea results from specific pathological conditions, the most common of which is endometriosis[7,8].

Primary dysmenorrhea can significantly affect women's quality of life by limiting participation in daily activities, increasing absenteeism from work or school, and contributing to mood disturbances and sleep disruption[9,10]. Secondary dysmenorrhea, in contrast, may lead to long-term physical and psychological consequences, including chronic pelvic pain, anxiety, depression, distortion of pelvic anatomy, infertility, and an elevated risk of epithelial ovarian cancer[11-13].

Despite its wide-ranging physical and mental health impact, 50–70% of women with dysmenorrhea do not seek medical care[14,15]. Among those who do, the average delay in obtaining a medical evaluation exceeds four years. Adolescent girls, in particular, often wait up to six years from the onset of symptoms before consulting a physician—three times longer than adult women[15]. Barriers contributing to this delay include inadequate health insurance coverage, limited physician availability, and insufficient knowledge among healthcare providers regarding chronic pelvic pain[14]. Cultural norms also influence attitudes toward discussing menstrual pain, particularly among adolescents and their parents[16]. As a result, many individuals resort to self-management strategies, including over-the-counter medication, complementary therapies, and alternative treatments[17,18]. Delayed diagnosis of secondary dysmenorrhea can exacerbate disease progression, intensify pain, and increase the risk of complications, all of which further impair quality of life[8,19].

Given the wide variability in the reported prevalence of dysmenorrhea among adolescents[20] and the tendency to delay medical consultation[15], as well as the fact that most existing studies are community- based, there is a lack of precise data on the prevalence of primary versus secondary dysmenorrhea—particularly endometriosis—among adolescents and young adult women. Therefore, this study aims to determine the prevalence, associated risk factors, and underlying causes of dysmenorrhea among adolescents and young adults seeking hospital care, in order to guide the development of appropriate healthcare strategies for this population.

Materials and methods

This retrospective case-control study collected data from female patients aged 10 to 25 years who presented at the outpatient clinic of Khon Kaen Hospital, a tertiary care facility, between January 1, 2024, and December 31, 2024. This age range encompasses adolescents and young adults[3,21]. The study was approved by the Institutional Ethics Committee (KEXP 68002) prior to data collection.

Inclusion criteria were female patients in the specified age range who sought care for gynecologic conditions, such as dysmenorrhea, acute or chronic pelvic pain, leukorrhea, pelvic masses, amenorrhea, and abnormal uterine bleeding. Exclusion criteria included patients with symptoms related to normal

pregnancy (e.g., antenatal and postpartum care), incomplete essential clinical data (missing pelvic examination, ultrasound findings, or diagnosis), or a final diagnosis of a non-gynecologic condition.

The primary condition of interest was dysmenorrhea, which included both primary dysmenorrhea and secondary dysmenorrhea due to endometriosis. Primary dysmenorrhea was diagnosed in patients reporting menstrual pain without any abnormal findings on pelvic examination or ultrasound[22]. Endometriosis was diagnosed based on a clinical history of progressive dysmenorrhea, dyspareunia, dysuria, or dyschezia—particularly when symptoms occurred during menstruation—along with abnormal pelvic examination findings (e.g., pelvic nodularity) or supportive pelvic ultrasound findings via the transvaginal or transabdominal route, depending on the patient's sexual activity history[8,23].

Ultrasound findings diagnostic for endometriosis included ovarian endometrioma and uterine adenomyosis. The ultrasound feature of an ovarian endometrioma was defined as a persistent, at least 3 months of homogeneous, low-level, or ground-glass echogenicity ovarian cyst. Additionally, other ultrasound imaging features included an unilocular or multilocular appearance, a thick cyst wall, and varying degrees of vascularization, ranging from absent to moderate[24,25]. Adenomyosis was diagnosed when at least two of the following sonographic features were observed: asymmetrical myometrial thickening, myometrial cysts, linear striations, hyperechoic islands, or an irregular/infiltrated endometrial–myometrial junction[24]. Patients diagnosed with primary dysmenorrhea or endometriosis were classified as the case group, while patients of the same age range presenting with other gynecologic conditions served as the control group. Although secondary dysmenorrhea can result from other conditions, such as pelvic infections or masses, which are more commonly present as non-cyclic pain, these cases were included in the control group due to their differing pathophysiology.

Based on the findings of Weissman et al.[26], which reported risk factors for primary dysmenorrhea, a sample size of at least 282 cases was required. To enhance the precision of the estimates, a case-to- control ratio of 1:3 was employed in the study.

Data were extracted from electronic medical records, including baseline characteristics (age, occupation, education, marital status, parity, body mass index [BMI], and smoking history). Menstrual history variables were also collected, regarding age at menarche, menstrual regularity, cycle length and duration, presence of heavy menstrual bleeding, and associated diagnoses. Heavy menstrual bleeding was assessed through subjective evaluation by the patient or parent, based on deviation from the usual cycle.

The one-year prevalence of dysmenorrhea was calculated by dividing the number of dysmenorrhea cases by the total number of gynecologic patients within the same age group. For comparative analysis and assessment of potential risk factors, variables such as age, BMI, age at menarche, length of menstrual cycle and duration were categorized.

Age groups were defined as follows: young adolescents (10–14 years), older adolescents (15–17 years), and young adults (18–25 years)[3,21]. BMI categories were based on the World Health Organization (WHO) guidelines, with underweight defined as BMI <18.5 kg/m², normal weight as 18.5–24.9 kg/m², overweight as 25- 29.9 kg/m² and obesity as ≥ 30 kg/m² [27]. Age at menarche was categorized into two groups: early onset (<12 years) and later onset (≥12 years)[28]. A short menstrual cycle was defined as a cycle interval of less than 21 days, while short menstrual duration was defined as fewer than 3 days of menstrual bleeding per cycle[29].

Descriptive statistics were used to summarize the data: means and standard deviations for continuous variables, and frequencies and percentages for categorical variables. Between-group comparisons were conducted using the independent t-test or the Wilcoxon rank-sum test for continuous variables, depending on the data distribution. For categorical

variables, the chi-square test or Fisher's exact test was applied as appropriate.

According to prior literature, potential risk factors for dysmenorrhea include age, BMI, marital status, occupation, educational level, smoking status, early onset of menarche, short menstrual duration, menstrual regularity, and heavy menstrual bleeding[20,26,30,31]. To evaluate the association between dysmenorrhea and these factors, a logistic regression model was used, incorporating both univariable and multivariable analyses. Results were presented as crude odds ratios (ORs) and adjusted odds ratios (AORs), along with corresponding 95% confidence intervals (CIs). Statistical significance was defined as a p-value of less than 0.05. The missing data were assumed to be missing at random (MAR) and handled using multiple imputation by chained equations (MICE) method[32].

All statistical analyses were performed using Stata software, version 18.0 (Stata Corp, College Station, TX, USA).

Results

During the study period, a total of 44,614 adolescent and young adult women attended the outpatient unit at Khon Kaen Hospital. Of these, 2,752 (6.1%) presented with gynecologic conditions. Within this subgroup, the prevalence of dysmenorrhea was 10.5%, corresponding to 290 individuals diagnosed with the condition. Among these, 213 (7.7%) were diagnosed with primary dysmenorrhea and 77 (2.8%) with endometriosis (Figure 1). For the control group, a sample of 870 adolescent and young adult women with other gynecologic conditions was randomly selected, using a 1:3 case-to-control ratio, resulting in a total of 1,160 records reviewed.

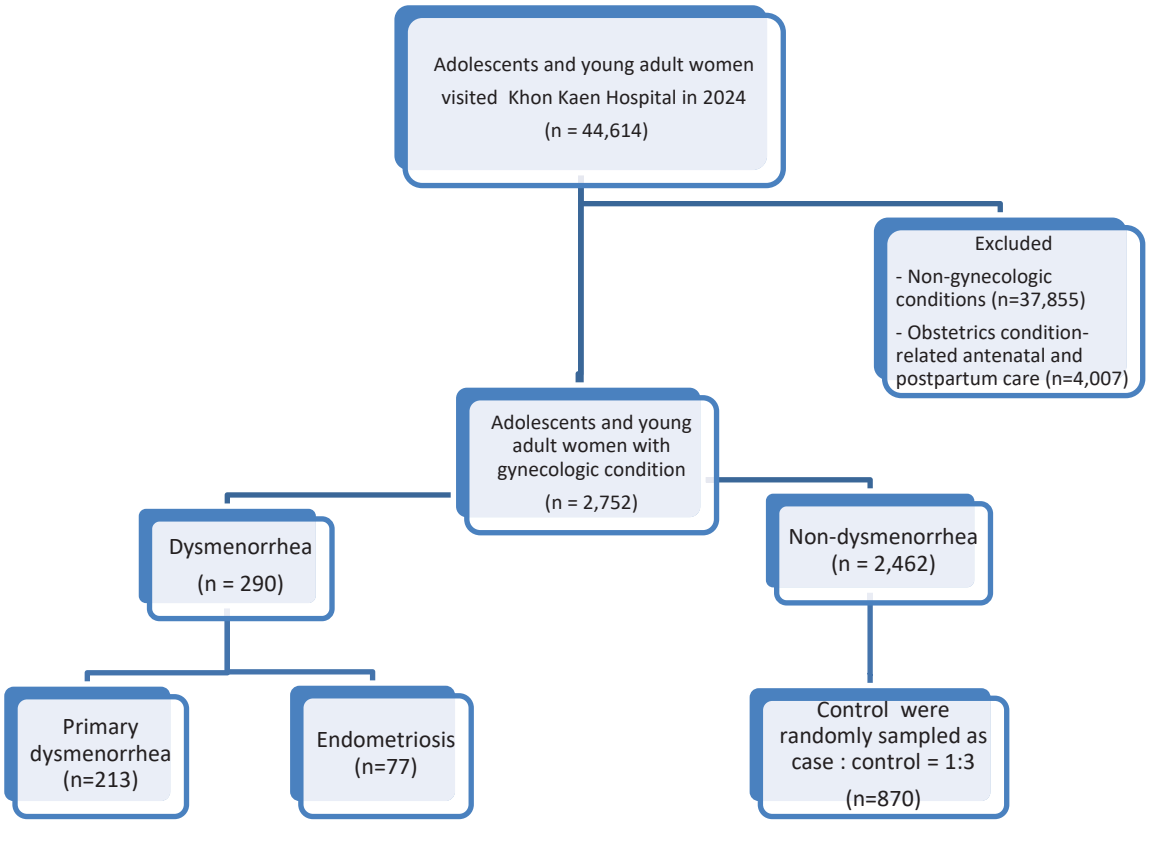

Figure 1 Patient flow diagrams and matching cases and controls.

Baseline characteristics of the study population are summarized in Table 1. Approximately 80% of participants in both groups were classified as young adults. All these variables showed statistically significant differences between groups, except for age category (p = 0.243) and education level (p = 0.939). The mean age was 20.4 ± 3.2 years, and the mean BMI fell within the normal weight range. Among the 290 patients with dysmenorrhea, 110 (38.7%) were students, with the majority—75 (68.2%)—enrolled in primary and secondary school. Dysmenorrhea was reported by 60 (20.7%) adolescents. Across age groups, over 80% of participants were single and nulliparous.

Menstrual history data are presented in Table 2. Statistically significant differences were observed for only two variables: menstrual cycle regularity (p-value = 0.011) and history of heavy menstrual bleeding (p-value = 0.001). The mean age at menarche was 12.6 ± 1.4 years, with a range of 8 to 16 years. Regular menstrual cycles were reported by 59.4% of patients. The mean menstrual cycle interval was 30.0 ± 2.6 days (range: 21–41 days), and the mean duration of menstruation was 4.8 ± 1.5 days (range: 1–10 days). The youngest patients diagnosed with primary dysmenorrhea and endometriosis were 12 and 16 years old, respectively (Figure 2).

Table 1 Demographic data

Variables	Total (n = 1,160) n (%)	Case (n = 290) n (%)	Control (n = 870) n (%)	Missing n (%)	p-value
Age (years), mean ± SD	20.4±3.2	20.5±3.2	20.4±3.1	-	0.485
Age group (years),					0.243
18-25	944 (81.4)	230 (79.3)	714 (82.1)		
15-17	167 (14.4)	50 (17.2)	117 (13.4)		
10-14	49 (4.2)	10 (3.5)	39 (4.5)		
BMI (kg/m^2), mean ± SD	21.7±4.6	21.0±4.4	21.9±4.9	2 (0.2)	0.007
BMI (kg/m^2),	1,158 (99.8)	288 (24.8)	870 (74.9)	2 (0.2)	0.127
18.5-24.9 (Normal)	678 (57.5)	165 (57.3)	498 (57.2)		
< 18.5 (Underweight)	292 (24.8)	82 (28.5)	204 (23.5)		
25.0-29.9 (Overweight)	123 (10.4)	26 (9.0)	96 (11.0)		
≥ 30.0 (Obesity)	87 (7.4)	15 (5.2)	72 (8.3)		
Occupation	1,140 (98.3)	284 (24.5)	856 (73.8)	20 (1.7)	0.019
Housewife	32 (2.8)	2 (0.7)	30 (3.5)		
Student	479 (42.0)	110 (38.7)	369 (43.1)		
Employed	538 (47.2)	149 (52.5)	389 (45.4)		
Unspecified	91 (8.0)	23 (8.1)	68 (8.0)		
Educational level	789 (68.0)	178 (15.3)	611 (52.7)	371 (32.0)	0.939
Primary	30 (3.8)	6 (3.4)	24 (3.9)		
Secondary	471 (59.7)	108 (60.7)	363 (59.4)		
Bachelor and postgraduate	288 (36.5)	64 (35.9)	224 (36.7)		
Marital status	1,156 (99.7)	288 (24.9)	868 (74.8)	4 (0.3)	0.003
Married/Divorced/Widowed	186 (16.3)	29 (10.1)	152 (17.5)		
Single	958 (83.7)	259 (89.9)	716 (82.5)		

Table 1 Demographic data (Cont.)

Variables	Total (n = 1,160) n (%)	Case (n = 290) n (%)	Control (n = 870) n (%)	Missing n (%)	p-value
Parity	1,037 (89.4)	218 (18.4)	819 (70.6)	123 (10.6)	0.001
Multiparous	168 (16.2)	19 (8.7)	149 (18.2)		
Nulliparous	869 (83.8)	199 (91.3)	670 (81.8)		
Smoking	1,098 (94.7)	252 (21.8)	846 (72.9)	62 (5.3)	0.027
No	1,072 (96.0)	248 (98.4)	807 (95.4)		
Yes	45 (4)	4 (1.6)	39 (4.6)		

BMI, body mass index; SD, standard deviation.

Table 2 Menstrual characteristics

Variables	Total (n = 1,160) n (%)	Case (n = 290) n (%)	Control (n = 870) n (%)	Missing n (%)	p-value
Age at menarche (years), mean ± SD	12.6±1.4	12.8±1.3	12.5±1.4	858 (74.0)	0.192
Early menarche (years)	302 (26.0)	58 (5.0)	244 (21.0)	858 (74.0)	0.578
< 12	58 (19.2)	9 (15.5)	49 (20)		
≥ 12	244 (80.8)	49 (84.5)	195 (80)		
Menstrual regularity	1,071 (92.3)	254 (21.9)	817 (70.4)	89 (7.7)	0.011
Regular	635 (59.4)	168 (66.1)	467 (57.2)		
Irregular	436 (40.6)	86 (33.9)	350 (42.8)		
Length of menstrual cycle (days), mean ± SD	30.1±2.5	30.0±2.5	30.1±2.6	859 (74.1)	0.860
Short menstrual cycle (days)	301 (25.9)	71 (6.1)	230 (19.4)	859 (74.1)	N.A.
< 21	0	0	0		
≥ 21	301(100.0)	71 (100.0)	230 (100.0)		
Menstrual duration (days), mean ± SD	4.8±1.5	4.8±1.4	4.8±1.6	537 (46.3)	0.856
Short menstrual duration (days)	623 (53.7)	127 (11.0)	496 (42.7)	537 (46.3)	0.819
< 3	31 (5.0)	7 (5.5)	24 (4.8)		
≥ 3	592 (95.0)	120 (94.5)	472 (95.2)		
Heavy menstrual bleeding	1,157 (99.7)	290 (25.0)	867 (74.7)	3 (0.3)	0.001
No	1,106 (95.6)	267 (92.1)	839 (96.8)		
Yes	51 (4.4)	23 (7.9)	28 (3.2)		

SD, standard deviation.

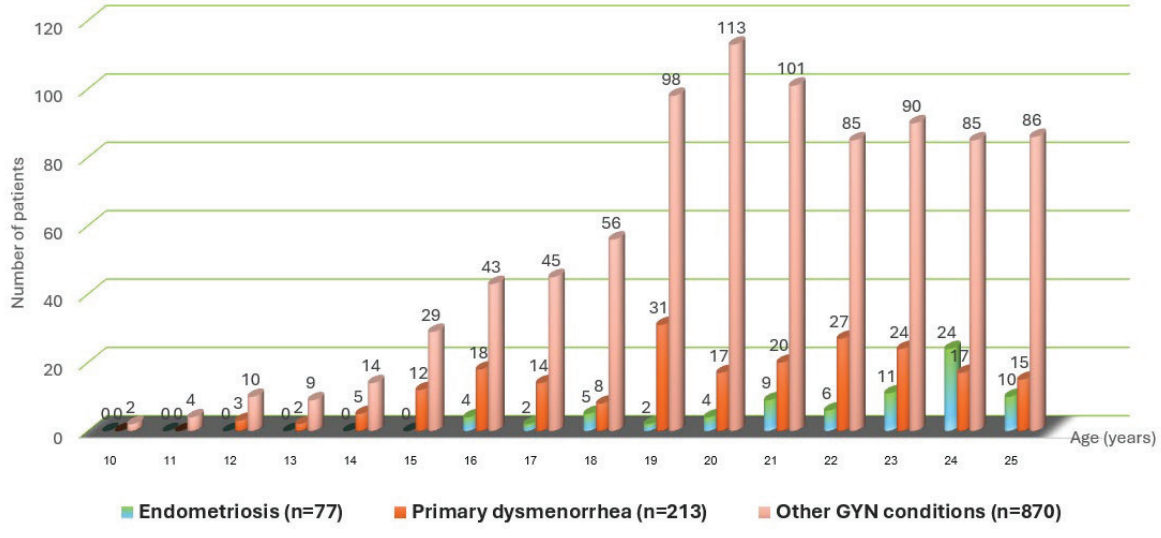

Figure 2 Distribution of gynecologic (GYN) adolescent and young adult patients (n = 1,160)

Table 3 presents the univariable analysis, which identified several potential risk factors for dysmenorrhea, including occupation (p = 0.038 for students, p = 0.017 for employees, and p = 0.033 for unspecified), marital status (p = 0.003), parity (p = 0.001), smoking (p = 0.046), menstrual irregularity (p = 0.013), and heavy menstrual bleeding (p = 0.001). However, in the multivariable analysis, nulliparity (adjusted odds ratio (AOR) = 2.04; 95% CI: 1.05–3.95; p = 0.034), smoking (AOR = 3.67; 95% CI: 1.28–10.59; p = 0.017), menstrual irregularity (AOR = 1.47; 95% CI: 1.07–2.00; p = 0.016), and history of heavy menstrual bleeding (AOR = 3.26; 95% CI: 1.77–6.01; p < 0.001) remained statistically significant risk factors for dysmenorrhea.

Table 3 Univariable and multivariable logistic regression analysis of association factors for dysmenorrhea

Variables	Univariable			Multivariable		
	Crude OR	95%CI	p-value	Adjusted OR	95%CI	p-value
Age group (years)						
18-25	Ref.			Ref.		
15-17	1.32	0.92-1.90	0.127	1.31	0.84-2.03	0.226
10-14	0.79	0.39-1.62	0.529	1.04	0.40-2.70	0.929
BMI (kg/m^2)						
18.5-24.9 (Normal)	Ref.			Ref.		
< 18.5 (Underweight)	1.22	0.89-1.66	0.219	1.20	0.86-1.66	0.274
25.0-29.9 (Overweight)	0.81	0.51-1.30	0.381	0.84	0.52-1.37	0.493
≥ 30.0 (Obesity)	0.62	0.35-1.12	0.113	0.68	0.37-1.24	0.206
Occupation						
Housewife	Ref.			Ref.		
Student	4.62	1.08-19.69	0.038	1.78	2.64-8.41	0.465
Employed	5.81	1.38-24.78	0.017	2.86	0.63-13.06	0.173
Unspecified	5.10	1.13-23.34	0.033	1.82	0.36-9.11	0.466
Educational level						
Primary	Ref.			Ref.		
Secondary	1.21	0.50-2.94	0.660	1.21	0.43-3.42	0.719
Bachelor and postgraduate	0.99	0.40-2.41	0.976	1.03	0.35-3.04	0.962

Table 3 Univariable and multivariable logistic regression analysis of association factors for dysmenorrhea (Cont.)

Variables	Univariable			Multivariable		
	Crude OR	95%CI	p-value	Adjusted OR	95%CI	p-value
Marital status						
Married/Divorced/Widowed	Ref.	1.25-2.89	0.003	Ref.	0.77-2.48	0.272
Single	1.90			1.38		
Parity						
Multiparous	Ref.			Ref.		
Nulliparous	2.32	1.43-3.78	0.001	2.04	1.05-3.95	0.034*
Smoking						
No	Ref.			Ref.		
Yes	2.83	1.02-7.84	0.046	3.67	1.28-10.59	0.017
Early menarche (years)						
< 12	Ref.			Ref.		
≥ 12	0.89	0.46-1.72	0.727	0.84	0.40-1.80	0.659
Menstrual regularity						
Regular	Ref.			Ref.		
Irregular	1.45	1.08-1.93	0.013	1.47	1.07-2.00	0.016*
Short menstrual duration (days)						
< 3	Ref.					
≥ 3	1.14	0.47-2.74	0.776	1.38	0.56-3.40	0.485
Heavy menstrual bleeding						
No	Ref.			Ref.		
Yes	2.58	1.46-4.57	0.001	3.26	1.77-6.01	< 0.001*

CI, confidence interval; OR, odds ratio; Ref., reference.

Discussion

The study revealed that the prevalence of dysmenorrhea among adolescent and young adult women accounted for approximately one in ten (10.5%) of all primary gynecologic complaints, leading to women's health care visits. Of these cases, the majority (73.4%) were classified as primary dysmenorrhea, while the remaining 26.6% were attributed to endometriosis. According to the literature, the reported prevalence of dysmenorrhea varies widely, ranging from 16% to 93%, with lower prevalence rates (2%–29%) observed in studies focusing on populations experiencing severe pain[33].

The prevalence found in the present research aligns more closely with those reported in studies of severe dysmenorrhea. This may be explained by differences in study settings—specifically, hospital-based versus community- or school-based populations. In this context, hospital-based data are more likely to reflect cases involving severe or persistent dysmenorrhea, often in individuals who have not responded to initial medical or alternative treatments[14,15]. These cases may progress to severe dysmenorrhea or chronic pelvic pain, thereby contributing to the research prevalence observed in hospital settings, comparable to that reported in studies on severe cases.

Although the prevalence of dysmenorrhea among gynecologic patients is relevant to the prevalence of severe dysmenorrhea cases, the overall prevalence among all outpatient visitors—including those in pediatrics, internal medicine, and surgery—was only 0.65% in 2024. This low figure may reflect a genuinely low prevalence or may instead indicate underreporting and barriers to care-seeking among young women experiencing dysmenorrhea[14,15]. Following multiple imputation to address missing data and improve analytical accuracy, the study employed a full multivariable logistic regression model to identify factors associated with dysmenorrhea. The analysis indicated that nulliparity, menstrual cycle irregularity, heavy menstrual bleeding and smoking were significant risk factors for dysmenorrhea.

Specifically, heavy menstrual bleeding was associated with a 3.26-fold increased risk of dysmenorrhea compared to individuals without this symptom, consistent with findings from previous studies[20,30]. Additionally, women with irregular menstrual cycles were 1.47 times more likely to experience dysmenorrhea than those with regular cycles. Similarly, nulliparous women had a 2.04-fold higher risk of dysmenorrhea, which aligns with earlier research[20,34].

The evidence supporting heavy menstrual bleeding as a risk factor for dysmenorrhea is grounded in the pathophysiological theory that implicates prostaglandins as central mediators of menstrual pain. Prostaglandins stimulate myometrial contractions and vasoconstriction, leading to hypoxia and ischemia of the myometrium. This ischemic environment results in the accumulation of anaerobic metabolites, which activate nociceptive nerve fibers and ultimately produce the pain characteristic of dysmenorrhea. A rapid decline in progesterone levels during menstruation triggers the release of lysosomal enzymes, which initiate the synthesis of prostaglandins[35,36]. Furthermore, endometrial tissue and menstrual fluid from women with dysmenorrhea have been found to contain significantly higher levels of prostaglandins compared to those without the condition[37].

Smoking was associated with a 3.67-fold increased risk of dysmenorrhea compared to non-smokers. This finding is consistent with a systematic review and meta-analysis of observational studies, which reported that smokers were 1.45 times more likely to experience dysmenorrhea than non-smokers (OR = 1.45, 95% CI: 1.30–1.61)[31]. The proposed pathophysiological mechanisms underlying this association include the vasoconstrictive effects of nicotine, which reduce uterine blood flow and induce myometrial hypoxia, thereby contributing to painful uterine contractions. Additionally, smoking has been shown to influence endocrine function, prolonging the duration of menstruation and contributing to ovarian atrophy[38,39]. Supporting this evidence, a study by Ju, et al.[40] found that women who quit smoking experienced relief from dysmenorrhea symptoms.

Previous studies have identified younger age—particularly under 25 years—as a risk factor for dysmenorrhea, with risk decreasing as age increases[26]. However, in this study, age was categorized into three groups—early adolescence (10–14 years), late adolescence (15–17 years), and young adulthood (18–25 years). The analysis found no significant association between these age groups and the occurrence of dysmenorrhea.

Although this study found the average age at menarche to be 12.6 years based on data from 302 participants, this is comparable to the national average of 12.3 years[41]. The age at menarche typically ranges from 8 to 16 years, and cases of dysmenorrhea were observed in girls as young as 12 years old. This observation is consistent with the established pathophysiology of primary dysmenorrhea, which generally emerges with the onset of ovulatory cycles—usually within two years after menarche[35]. In this study, the earliest age at which endometriosis was diagnosed was 16 years, aligning with evidence indicating an overall diagnosis time range of 5-12 years between the first onset of dysmenorrhea and a definitive diagnosis of endometriosis[42]. This diagnostic

delay may reflect an underdiagnosis or incubation period of the disease, which can be influenced by several factors, including duration of estrogen exposure, immune and inflammatory responses, individual stem cell behavior, genetic predisposition, and retrograde menstruation[42,43].

Approximately one-third of the adolescents and young adult women with dysmenorrhea in this study were students, with nearly 70% of them enrolled in primary or secondary school. Although the majority of these individuals were diagnosed with primary dysmenorrhea, one in four was found to have endometriosis, with the youngest case diagnosed at 16 years of age. A longitudinal study has demonstrated that 71–83% of untreated endometriotic lesions either progress or remain unchanged over the course of one year[44]. This evidence suggests that delays in the diagnosis of dysmenorrhea may contribute to the progression of underlying pathology, such as endometriosis. These findings highlight the critical need for increased awareness among healthcare providers, parents, and educators regarding the prevalence and potential severity of dysmenorrhea. Timely counseling, appropriate diagnostic evaluation, and early management strategies should be prioritized for adolescents and young adults experiencing menstrual pain.

Social and cultural factors also warrant attention. Previous research has documented that feelings of embarrassment and stigma surrounding menstruation are common among adolescents and young women[45]. These feelings may lead to avoiding discussions about this topic with family members, teachers, and peers, and can contribute to delays in seeking appropriate medical care[46]. These sociocultural barriers highlight the need for future research to explore adolescents' and young adults' attitudes and perceptions toward menstruation and dysmenorrhea. Such research should inform the development of effective strategies, including hospital-based interventions, counseling services, and targeted educational programs within school and university settings.

One of the strengths of this study lies in the confirmation of diagnoses through the use of medical records. Unlike many community- or school-based studies that rely on self-reported data and participant recall —often without clinical validation[42] —this study provides more robust evidence for distinguishing between primary and secondary dysmenorrhea. These findings highlight concerns regarding the prevalence of dysmenorrhea, particularly endometriosis, among adolescent and young adult women.

However, a key limitation of this study is its retrospective design, which led to incomplete data for several potentially influential risk or protective factors, such as family history, physical activity, psychological stress, history of sexual abuse, and oral contraceptive use. Additionally, the study lacked data to assess the impact of dysmenorrhea on quality of life—an essential aspect for understanding its broader consequences on adolescents and young adults. Furthermore, as the study focused primarily on endometriosis, other possible causes of secondary dysmenorrhea, including pelvic anatomical anomalies, pelvic masses, and infections, were not investigated. Finally, some variables, including age at menarche, length of menstrual cycle, and menstrual duration, had up to 70% missing data, which may have contributed to increased imprecision and reduced stability of the parameter estimates despite using multiple imputation.

Overall, the research findings highlight the importance of early recognition and targeted interventions for dysmenorrhea. School-based education and counseling programs may play a key role in improving awareness of its prevalence, associated risk factors, and the importance of modifying preventable risks such as smoking. The results also provide important insights for healthcare professionals, emphasizing the need to consider both primary and secondary causes when evaluating and managing dysmenorrhea. Notably, endometriosis can present as early as 16 years of age, underscoring the importance of timely assessment and appropriate management to prevent disease progression in undiagnosed patients.

Conclusion

Dysmenorrhea accounted for approximately one in ten primary gynecologic symptoms, prompting adolescents and young adult women to seek care. Symptoms were reported as early as 12 years of age, and endometriosis was diagnosed in patients as young as 16. Heavy menstrual bleeding, irregular menstrual cycles, nulliparity, and smoking were identified as significant risk factors for dysmenorrhea.

Author Contributions

Conceptualization, V.S. and S.S.; Methodology, V.S. and S.S.; Validation, V.S., S.O. and S.S.; Formal analysis, S.O. and S.S.; Data curation, V.S., A.S., and S.S.; Writing -Original draft, V.S.; Writing - Review and Editing, S.O. and S.S.; Visualization, A.S., S.O. and S.S.; Supervision, V.S. and S.S.; Project Administration, V.S.

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Institutional Review Board Statement

The study was conducted in accordance with the Declaration of Helsinki, and the protocol was approved by the Khon Kaen Hospital Institute Review Board in Human Research (Project identification code KEXP 68002) on 16 January 2025.

Informed Consent statement

Informed consent was waived due to the study being a non-experimental, non-invasive, retrospective study.

Data Availability

Dataset available on request from the corresponding authors due to privacy or ethical reasons.

Conflicts of interest

All the authors declare that they have no conflicts of interest.

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