

BMJ Open Primary dysmenorrhea and self-care strategies among Chinese college girls: a cross-sectional study

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ABSTRACT

Objectives To explore the prevalence of primary dysmenorrhea (PD), the characteristics of PD and self-care strategies for managing PD among Chinese college girls.

Design Cross-sectional study.

Setting Changsha, China.

Participants A total of 2555 college girls were recruited using multistage cluster random sampling.

Outcome measures A self-report questionnaire was used to measure sociodemographic information, characteristics of PD and self-care strategies for managing PD.

Additionally, a Visual Analogue Scale was used to measure pain severity.

Results Of the 2555 girls, 1306 had experienced PD, representing a 51.1% prevalence. In addition, the prevalence rates of mild, moderate and severe pain in PD were 18.1%, 27.7% and 5.4%, respectively. The most common symptoms associated with PD were cramps (96.9%), weakness (70.0%), backache (65.1%), facial blemishes (55.3%) and irritability (55.3%). Commonly used self-care strategies for managing PD comprised reducing physical activity (94.6%), keeping warm (84.6%), communicating dysmenorrhea with friends or classmates (79.0%), drinking warm beverages (75.7%) and avoiding cold drinks and foods (74.2%). In addition, only 34.8% self-medicated with Western medicine (15.6%), traditional Chinese medicine (8.6%), or both (10.6%). Medical advice was sought by 27.4% of subjects from a Western medical doctor (10.3%), a doctor of traditional Chinese medicine (13.6%), or both (3.5%). Girls who had greater pain severity were more likely to be self-medicated (OR=7.01; 95% CI 4.50 to 10.91), use complementary therapies (OR=2.64; 95% CI 1.70 to 4.10) and seek medical advice (OR=5.93; 95% CI 3.80 to 9.24).

Conclusions PD is highly prevalent among Chinese college girls, with a high burden of symptoms. In addition, these girls are most likely to change their lifestyle, communicate dysmenorrhea with friends or mothers, use heat therapy and engage in self-talk, but less likely to self-medicate or seek medical advice for managing PD.

INTRODUCTION

Primary dysmenorrhea (PD) is defined as cramping pain in the lower abdomen that occurs at the onset of menstruation in the absence of any identifiable pelvic disease.¹ It is one of the most common gynaecological symptoms among adolescents and young

Strengths and limitations of this study

- The results of this study on the prevalence of primary dysmenorrhea (PD), characteristics of PD and self-care strategies for managing PD are useful for assessing the burden of dysmenorrhea in the population of Chinese college girls and for planning and allocating health resources.
- The study sample was sufficiently large and randomly collected; thus, it was representative of the Chinese college girls.
- The Cox Menstrual Symptom Scale was first used to investigate the most common symptoms associated with PD.
- The screening of PD, characteristics of and self-care strategies for managing PD were based on self-reported information, which may be biased.
- There is a possibility of bias in the outcome measures if the 41 girls who were absent from school during the investigation period had different characteristics than those who were available and participated in the study.

women, with the prevalence of PD ranging from 45% to 95%.²⁻⁴ The overproduction of uterine prostaglandins is the most widely accepted explanation for the pathogenesis of PD. Excessive release of prostaglandins, particularly prostaglandin F₂ alpha, originating in the secretory endometrium of the menstrual fluid, is believed to cause the condition.⁵ PD has different levels of negative impacts on the physical, psychological and social functions of women, leading to short-term absences from study or work.⁶⁻⁸ Despite the high prevalence of PD among adolescents and young women worldwide, PD is often poorly treated and even disregarded by health professionals, pain researchers and the women themselves.⁹

Self-care is defined as practising activities that individuals initiate and perform on their own behalf in maintaining life, health and well-being.¹⁰ The self-care measures adopted by girls with PD varied across countries. Many studies have consistently reported that ~58% to 70% of Western adolescent girls

self-medicate with non-steroidal anti-inflammatory drugs and analgesic medicine for dysmenorrhea.^{11–13} These data are inconsistent with the results of a study, which indicated that the majority of Asian girls had reservations against the use of medications to treat PD because they worried about dependence and side effects.¹⁴ Apart from pharmacological strategies, dietary modifications, heat therapy, warm beverages, sleep, massage therapy and keeping warm were commonly reported as measures for the management of dysmenorrhea.^{15–17} Although many quantitative studies have investigated self-care measures for PD, they did not investigate self-care strategies such as seeking advice from others or doctors and self-regulation of negative emotions.

Self-care includes seeking services from healthcare providers and independent activities to treat diseases and promote health.¹⁸ A focus group study emerged with seven themes of self-care strategies for dysmenorrhea: reducing physical activity, incorporating dietary modifications, using herbal remedies or medications, applying complementary therapies, paying attention to symptom clusters of discomfort and expressing emotions.¹⁹ Furthermore, another qualitative study summarised four aspects of self-care strategies in dysmenorrhea, namely, lifestyle changes, symptom management, seeking medical advice and communicating dysmenorrhea with others.¹⁴ With an in-depth understanding of self-care strategies for dysmenorrhea, quantitative studies based on a large study population are needed to explore the use of self-care strategies for PD among adolescents and young women.

To the best of our knowledge, there are no quantitative studies on self-care strategies for PD in young Chinese girls. The aim of this study was to explore the prevalence of PD, the characteristics of PD and self-care strategies for managing PD and then provide healthcare professionals with the needed data to improve interventions for managing PD among Chinese college girls.

METHODS

Sample size calculation

Sample size was calculated using the formula for cross-sectional studies:

$n = u_{\alpha/2}^2 p(1 - p) / d^2$, where $u_{\alpha/2} = 1.96$ when $\alpha = 0.05$, p is the prevalence of dysmenorrhea (which is 55%, averaged between 45% and 95% in a previous study,² and d is the admissible error (which is 3% in this study). The required sample size was 1160, which included an extra 10% to allow for subjects lost during the study.

Study design and participants

A multistage stratified cluster random sampling method was used to select a representative sample of college girls with PD between September and November 2017 in Changsha, central south area of China. ‘Cluster’ here refers to college of a university or vocational school. In the first stage, Central South University, Changsha University and Changsha Health Vocational College were randomly

selected according to the teaching level of the school. In the second stage, four colleges of Central South University, two colleges of Changsha University and one college of Changsha Health Vocational College were randomly selected according to the student’s scale. In the final stage, all girls from these colleges who were in the first to third years of study were considered for this investigation.

Inclusion criteria for PD were diagnosed as having PD using a self-report screening questionnaire and diagnosed with PD as described in the eighth edition of *Gynecology and Obstetrics*.²⁰ Moreover, subjects without pelvic disease and those who had experienced dysmenorrhea were included in the study. Those with hypoplastic vagina were excluded.

Data collection and measurements

Data were collected within 30 min after class by trained research assistants from each class. The research assistants presented the completed questionnaires to the supervisors for verification. Finally, the principal investigator of each college checked the completion of data collection using a quality control form.

PD screening

A self-report questionnaire was designed based on previous research and qualitative interviews on the college girls with PD. A pilot study was conducted prior to the main study to ascertain the ease with which the participants were able to answer the questionnaire. Following this, a number of minor editorial changes were made to the content and structure of the questionnaire. PD was identified on the basis of the questions: ‘Do you experience menstrual cramps, abdominal pain or backache throughout your menstrual period?’ and ‘Do you have the following diseases or symptoms?’. Listed diseases in this regard included pelvic inflammation, endometriosis, adenomyosis, hysteromyoma, secondary dysmenorrhea, absence of menstruation and other diseases. Other diseases needed to be specified by the respondent.

Sociodemographic information

Sociodemographic information measured for this study included university, college, major, grade, class, age, ethnicity, education level of parents, annual family income and family population. The education level of parents was defined as low (middle school and lower) and high (high school and above). Average household income (AHI) was computed using the following formula: AHI=annual family income/family population. In 2016, the per capita disposable income of Chinese residents was ¥23 821/year. Therefore, the AHI was divided into two groups: low (¥23 821 and less) and high (greater than ¥23 821).

Anthropometric measurements and maternal history of PD

Anthropometric measurements collected for this study were weight and height. Weight was reported to the nearest 0.1 kg, whereas height was reported to the nearest 0.1 cm. Using this information, body mass index (BMI) was computed by applying the following formula:

BMI=kg/m². Participants were defined as being lean (BMI <18.5), normal (18.5≤BMI<24.0), overweight (24.0≤BMI<28.0) or obese (BMI ≥28.0) according to Chinese standards.²¹ Maternal history of PD was assessed from the following responses related to this question: yes, no and unknown.

Characteristics of PD

The following characteristics of PD were measured for this study: age at the first experience of dysmenorrhea, whether there was presence of pain with every menstruation, onset of pain, duration of pain, severity of pain and symptoms. The severity of pain was assessed using a Visual Analogue Scale (VAS), which consists of a 0 to 10 cm vertical scale with the descriptors 'no pain' at the bottom of the scale and 'worst possible pain' at the top of the scale. Scores from the VAS were categorised on the scale of 0 to 10 as mild (0–3.9), moderate (4–7.9) and severe (8–10). VAS is the most frequently used pain scale and is regarded as a valid instrument for evaluating menstrual pain.^{22–24} Symptoms associated with PD were assessed by asking participants whether they had experienced the eighteen menstrual symptoms as outlined in the Cox Menstrual Symptom Scale.²⁵

Self-care strategies for PD

Self-care strategies for PD comprised a total of 20 self-care strategies in 8 themes with 4 categories. In this regard, the lifestyle change category included reducing physical activity, keeping warm, drinking warm beverages and avoiding cold drinks and foods, spicy greasy foods or caffeine and sugary foods. The symptom management category included self-medication, such as taking Western medicine or traditional Chinese medicine; complementary therapies, such as heat therapy, massage and acupuncture; and self-regulation of negative emotions, such as taking part in distracting activities, emotional expression and self-talk to endure it. The communicating dysmenorrhea with others category included communicating dysmenorrhea with mother, other family member, friends or classmates and teacher for advice on how to manage dysmenorrhea. The seeking medical advice category included consulting a Western doctor or a doctor of traditional Chinese medicine. For each theme of self-care strategy, participants were asked whether they used it for managing PD during their experience of menstrual pain. If the answer was yes, participants were asked to answer the next multiple-choice questions related to the specific strategies presented for that theme. A range of open questions were also presented to ascertain patient's experiences relating to the use of each specific self-care strategy. Finally, participants were asked if they had used any other self-care strategies apart from those specified to ascertain whether they had reported all of the self-care strategies for PD.

Statistical analysis

The data were analysed using SPSS V.17.0. Sample characteristics were described as percentages and means±SDs.

Binary logistic regression analysis was performed to identify the differences in the eight themes of self-care strategy among individuals with different variables. Independent variables for the binary logistic regression analysis included (1) sociodemographic variables such as age, ethnicity, college, major, mother's level of education, father's level of education and AHI; (2) BMI and maternal history of PD; and (3) pain severity. A two-sided $p<0.05$ was considered statistically significant.

Patient and public involvement

There was no patient and public involvement in this study.

RESULTS

The seven selected clusters yielded a total of 2596 girls to be considered for this study. However, 41 girls were not in school during the investigation period and were excluded. Thus, 2555 girls were examined, representing an overall response rate of 94.25%. Of the 2555 girls, 1306 girls were identified as having experienced PD. In addition, 75 girls did not complete information regarding demographics, menstrual characteristics and self-care strategies. Therefore, they were excluded when analysing data related to these variables. Thus, with these exclusions, a total of 1231 girls with PD were included in all of the analyses, and they consisted of 74 from public health, 216 from economics and management, 235 from literature and journalism, 154 from medicine, 127 from mathematics and statistics, 277 from foreign languages and 148 from vocational health.

The prevalence of PD

A total of seven colleges were selected, and 2555 girls participated in our study. The prevalence of PD was 51.1% (1306 of 2555 girls) overall, with 18.1%, 27.7% and 5.4% of the girls reporting mild, moderate and severe pain, respectively. As shown in [table 1](#), the prevalence of PD increased with an increase in age. For example, the prevalence of PD in the 16–17 age group was 45.4%, but the prevalence was higher (69.5%) for the 22–23 age group. The prevalence of moderate and severe pain in the 16–17 age group was 30.1%, and its peak occurred at 43.4% in the 22–23 age group.

Characteristics of PD

A total of 1231 girls with PD completed the questionnaire, including their sociodemographic characteristics, anthropometric measurements and maternal history of dysmenorrhea ([table 2](#)). The mean±SD age of these subjects was 19.21±1.026 years, with 16 the youngest age and 23 the oldest age. Most of these girls had a normal BMI (62.6%), were Han Chinese (89.8%), completed university C3 (47.9%) and were non-medical majors (69.5%). Furthermore, 54.3% had mothers with a low education level, and 56.1% had fathers with a high education level. In addition, 65.0% of these girls had low household income, and 40.8% reported a maternal history of PD.

Table 1 Prevalence of primary dysmenorrhea according to different ages among college girls

Age	Non-PD	PD				The prevalence of PD			
		Total	Mild	Moderate	Severe	Total	Mild	Moderate	Severe
16–17 (n=326)	178	148	50	86	12	45.4	15.3	26.4	3.7
18–19 (n=1719)	837	882	329	465	88	51.3	19.1	27.1	5.1
20–21 (n=487)	227	260	77	149	34	53.4	15.8	30.6	7.0
22–23 (n=23)	7	16	6	7	3	69.5	26.1	30.4	13.0
All ages (n=2555)	1249	1306	462	707	137	51.1	18.1	27.7	5.4

PD, primary dysmenorrhea.

The characteristics of PD are presented in [table 3](#). The majority had experienced dysmenorrhea for 6 years or more (66.9%) and did not experience pain with every

menstruation (55.0%). Menstrual pain primarily began at the onset of menstrual flow (59.6%) and mostly lasted for 2–3 days (52.9%). Only 4.5% experienced pain for >4 days. The most common symptoms associated with PD were cramps (96.9%), weakness (70.0%), backache (65.1%), facial blemishes (55.3%), irritability (55.3%) and loss of appetite (55.0%). Additionally, some girls reported diarrhoea (36.5%), nervousness (34.2%), depression (33.3%), general aching (27.7%), headache (27.0%), leg aches (26.1%), insomnia (25.8%), dizziness (24.6%) and nausea (24.1%), whereas a few girls reported stomach aches (17.6%), vomiting (16.4%) and flushing (11.8%), which implied a high symptom burden of PD in their daily life.

Table 2 Characteristics of the study population (n=1231)

Characteristics	n	Mean±SD/%
Age (years)	1231	19.21±1.026
BMI		
Lean	384	31.2
Normal	771	62.6
Overweight	50	4.1
Obese	26	2.1
Ethnicity		
Han	1106	89.8
Non-Han	125	10.2
University		
C1	148	12.0
C2	493	40.1
C3	590	47.9
Major		
Medical	376	30.5
Non-medical	855	69.5
Mother's education		
Middle school and lower	668	54.3
High school and above	563	45.7
Father's education		
Middle school and lower	541	43.9
High school and above	690	56.1
Average household income (¥)		
23821 and less	800	65.0
Greater than 23821	431	35.0
History of mother's dysmenorrhea		
Yes	502	40.8
No	312	25.3
Unknown	417	33.9

BMI, body mass index.

Self-care strategies for managing PD

The distribution and frequency of the use of each self-care strategy for managing PD are shown in [table 4](#). Most girls with PD changed their lifestyles to avoid inducing or aggravating menstrual pain and other discomfort. For example, 94.6% of the girls with PD (n=1165) reported that they would reduce physical activity by avoiding heavy personal cleaning or housework or increasing time for rest. Additionally, 84.1% (n=890) reported that they would wear more clothes or avoid walking in the rain to keep their bodies warm, whereas 78.9% (n=835) reported that they would change their diet to include drinking warm beverages and avoiding cold drinks and foods. In terms of symptom management for relieving the menstrual pain and discomfort, 73.0% (n=899) reported that they would self-regulate negative emotions with self-talk to endure it, take part in distracting activities and express emotions to gain support from others. Furthermore, 56.5% (n=695) reported that they would use complementary therapies, mainly heat therapy. Only 34.8% (n=428) reported that they self-medicated, with 15.6% taking Western medicine, 8.6% taking traditional Chinese medicine and 10.6% taking both. In contrast, 89.3% (n=1099) communicated dysmenorrhea with others. Friends or classmates and mothers were the most important persons to whom girls turned for answers regarding methods for dealing with PD. Nevertheless, only 27.4% (n=337) reported that they had sought medical advice for PD, with 10.3% consulting a Western medical doctor, 13.6% consulting a doctor of Chinese traditional medical and

Table 3 Characteristics of primary dysmenorrhea (n=1231)

Characteristics	n	%
Duration of experiencing dysmenorrhea		
1–5 years	408	33.1
6 years or above	823	66.9
Presence of pain in every menstruation		
Yes	554	45.0
No	677	55.0
Onset of dysmenorrhea		
More than 2 days before menstrual flow	105	8.5
One day prior to menstrual flow	269	21.9
On the same day of menstrual flow	734	59.6
Second and third day of menstrual flow	123	10.0
Duration of pain		
1 day or less	524	42.6
2–3 days	651	52.9
4 days or above	56	4.5
VAS		
Mild (0–3.9)	437	35.5
Moderate (4–7.9)	665	54.0
Severe (8–10)	129	10.5
Symptoms		
Cramps	1193	96.9
Nausea	297	24.1
Vomiting	202	16.4
Loss of appetite	677	55.0
Headache	332	27.0
Backaches	801	65.1
Leg aches	321	26.1
Dizziness	303	24.6
Weakness	862	70.0
Diarrhoea	449	36.5
Facial blemishes	681	55.3
Stomachache	217	17.6
Flushing	145	11.8
Insomnia	318	25.8
General aching	341	27.7
Depression	410	33.3
Irritability	681	55.3
Nervousness	421	34.2

VAS, Visual Analogue Scale.

3.5% consulting both. Specifically, in 20 strategies, as shown in table 4, the majority reported that they would reduce physical activity (94.6%), keep warm (84.6%), communicate dysmenorrhea with friends or classmates

(79.0%), drink warm beverages (75.7%) and avoid cold drinks and foods (74.2%) to manage PD. In general, girls with PD were likely to change their lifestyles, communicate dysmenorrhea with others and self-regulate negative emotions for managing dysmenorrhea, but most of them did not self-medicate, adopt acupuncture or massage, or seek medical advice.

Predictors of self-care strategies for PD

As shown in table 5, girls aged 18–19 years (OR=1.71; 95% CI 1.09 to 2.68) and 20–23 years (OR=2.11; 95% CI 1.20 to 3.71) were more likely to keep warm than girls aged 16–17 years. Girls who were lean (OR=1.53; 95% CI 1.10 to 2.13) were more likely to carefully select their diets, but girls who were overweight (OR=0.45; 95% CI 0.25 to 0.83) or non-Han Chinese (OR=0.63; 95% CI 0.41 to 0.97) were less likely to carefully select their diets than girls who had a normal BMI, or Han Chinese, respectively. Girls who were non-medical majors (OR=1.57; 95% CI 1.04 to 2.37) were more likely to seek medical advice than girls who were medical majors. Girls who did not know if their mother had PD were less likely to carefully select their diets (OR=0.63; 95% CI 0.43 to 0.92), keep warm (OR=0.36; 95% CI 0.23 to 0.57), self-medicate (OR=0.59; 95% CI 0.42 to 0.81), use complementary therapies (OR=0.60; 95% CI 0.44 to 0.81), communicate dysmenorrhea with others (OR=0.41; 95% CI 0.25 to 0.67) and seek medical advice (OR=0.58; 95% CI 0.40 to 0.83). Girls who experienced greater pain severity were more likely to self-medicate (OR=7.01; 95% CI 4.50 to 10.91), use complementary therapies (OR=2.64; 95% CI 1.70 to 4.10) and seek medical advice (OR=5.93; 95% CI 3.80 to 9.24) than girls who experienced mild pain, but they were less likely to self-regulate negative emotions (OR=0.55; 95% CI 0.35 to 0.86).

DISCUSSION

Our study found that the prevalence of PD in college girls aged between 16 and 23 in Changsha, China was 51.1%, and the prevalence of moderate to severe PD in the same sample was 33.1%. When calculated for each age group, both prevalence rates tended to peak in the oldest age group, 22–23. The PD prevalence found in this study fits within the range of reported values, from 45% to 95% worldwide.^{2–4} However, it is less than the prevalence rates of 64.8%, 85.1%, 85.7% and 88% reported in Western countries.^{26–31} Furthermore, the moderate to severe PD prevalence found in this study is relatively lower than the highest (66.2%) but slightly above the lowest (30.40%) reported in Western countries.^{26 30 31} The variation in the prevalence rates may be due to dissimilarity in the definitions of PD, methods of data collection and study population. The most common symptoms associated with PD in our study were cramps, weakness, backaches, facial blemishes and irritability, which are generally consistent with the common symptoms of abdominal spasm, back pain, fatigue and weakness; nervousness, fatigue

Table 4 Distribution and frequency of self-care strategies among college girls with primary dysmenorrhea

Categories	Themes	Self-care strategies	n	%
Lifestyle changes	Carefully select diet (n=979, 79.5%)	Avoid cold drinks and foods	914	74.2
		Avoid spicy greasy foods	610	49.6
		Avoid caffeine and sugary foods	510	41.4
		Warm beverages	932	75.7
	Reduce physical activity (n=1165, 94.6%)	Reduce physical activity	1165	94.6
	Keep warm (n=1041, 84.6%)	Keep warm	1041	84.6
Symptom management	Self-medicate (n=428, 34.8%)	Take Western medicine	323	26.2
		Take traditional Chinese medicine	236	19.2
	Complementary therapies (n=695, 56.5%)	Heat therapy	694	56.4
		Massage	5	0.4
		Acupuncture	5	0.4
	Self-regulation of negative emotions (n=899, 73.0%)	Take part in distracting activities	277	22.5
		Expressing emotional	339	27.5
		Self-talk to endure it	686	55.7
Communicate dysmenorrhea with others	Communicate dysmenorrhea with others (n=1099, 89.3%)	Communicate with mother	903	73.4
		Communicate with friends or classmates	972	79.0
		Communicate with other family member	221	18.0
		Communicate with teacher	58	4.7
Seek medical advice	Seek medical advice (n=337, 27.4%)	Consult a Western doctor	170	13.8
		Consult a doctor of traditional Chinese medicine	210	17.1

and discomfort; and abdominal pain, fatigue and impatience.^{26 30 31} Overall, PD was highly prevalent among Chinese college girls, with a high symptom burden.

Furthermore, the findings of this study provided important results on self-care strategies for PD management among the Chinese college girls. For example, traditional Chinese medicine was relatively widely trusted by Chinese girls to address PD and shaped how they coped and practised dysmenorrhea self-care, especially for girls who were of older age, lean and Han Chinese. Meanwhile, the results of this study indicated that most Chinese girls with PD managed it by reducing physical activity, keeping themselves warm, drinking warm beverages and avoiding cold drinks and foods. The results were similar to those of previous studies in Hong Kong and Taiwan,^{15 16 19 32} but some of the Chinese methods for managing PD were not reported frequently in the non-Chinese populations.³³ For example, traditional Chinese dietary items, such as brown sugar water and ginger tea, were not reported in Western countries. In addition, none of the girls in this study reported engaging in physical exercise for managing PD, which was inconsistent with the findings of previous studies revealing that girls not only rested but also exercised to manage dysmenorrhea.^{34 35} Suggested physical exercise activities, such as yoga, jogging and other forms of moderate aerobic physical exercise, beyond the menstrual period are commonly promoted as a therapy

for menstrual cramps.³⁶ Therefore, the results of this study suggest that self-care for PD should be studied in a cultural context and that more interventions should focus on promoting a healthy lifestyle.

Self-medication was not considered a part of self-care among the Chinese college girls. The majority opted to use heat therapy to relieve the discomfort associated with PD and self-talk to endure PD. Only 34.8% self-medicated for PD, which is much lower than the 46.1%, 66.9% and 61.7% reported in North-Eastern Anatolia, Mexico and Turkey,^{11 12 34} respectively, and is contrary to what has been proposed by the WHO.³⁷ The lower rate of self-medication among this study population may be attributed to the conservative attitude of self-medication and the lack of knowledge about drugs for dysmenorrhea among Chinese college girls with PD. The use of heat therapy was also supported by studies in Taiwan and the American adolescent population.^{38 39} In this study, girls with greater pain severity of PD reported using self-medication and complementary therapy more frequently, and they self-regulated negative emotions less frequently. This finding highlights that more interventions are needed to provide girls with accurate information on self-medication and complementary therapies for PD, especially for girls with greater pain severity.

Girls would like to communicate dysmenorrhea with friends or classmates and mothers, but most of them

Table 5 The results of binary logistic regression for the use of self-care strategies for managing primary dysmenorrhea

Variables	C1	K3	S4	C5	S6	C7	S8
Age (years)							
16–17	–	1 (ref)	–	–	–	–	–
18–19	–	1.71 (1.09–2.68)*	–	–	–	–	–
20–23	–	2.11 (1.20–3.71)*	–	–	–	–	–
BMI							
Normal	1 (ref)	–	–	–	–	–	–
Lean	1.53 (1.10–2.13)**	–	–	–	–	–	–
Overweight	0.45 (0.25–0.83)*	–	–	–	–	–	–
Obese	1.27 (0.46–3.48)	–	–	–	–	–	–
Ethnicity							
Han	1 (ref)	–	–	–	–	–	–
Non-Han	0.63 (0.41–0.97)*	–	–	–	–	–	–
Major							
Medical	–	–	–	–	–	–	1 (ref)
Non-medical	–	–	–	–	–	–	1.57 (1.04–2.37)*
History of mother's dysmenorrhea							
No	1 (ref)	1 (ref)	1 (ref)	1 (ref)	–	1 (ref)	1 (ref)
Yes	0.95 (0.65–1.39)	0.84 (0.64–1.37)	0.87 (0.64–1.18)	0.90 (0.67–1.21)	–	0.81 (0.48–1.39)	1.08 (0.78–1.50)
Unknown	0.63 (0.43–0.92)*	0.36 (0.23–0.57)**	0.59 (0.42–0.81)**	0.60 (0.44–0.81)**	–	0.41 (0.25–0.67)***	0.58 (0.40–0.83)**
VAS							
Mild	.–	–	1 (ref)	1 (ref)	1 (ref)	–	1 (ref)
Moderate	.–	.–	1.97 (1.49–2.61)***	1.61 (1.25–2.06)***	0.64 (0.48–0.85)**	–	1.99 (1.46–2.70)***
Severe	.–	.–	7.01 (4.50–10.91)***	2.64 (1.70–4.10)***	0.55 (0.35–0.86)**	–	5.93 (3.80–9.24)***

C1: careful select diet; K3: keep warm; S4: self-medication; C5: complementary therapies; S6: self-regulation of negative emotions; C7: communicate dysmenorrhea with others; S8: seek medical advice. Non-significant *p<0.05; **p<0.01; ***p<0.001.

BMI, body mass index; VAS, Visual Analogue Scale.

do not want to seek medical advice for PD. Friends and mothers were the most important persons to whom Chinese girls turned for answers regarding methods for dealing with dysmenorrhea, which is also supported by previous studies.^{14 34} Although girls with greater pain severity were more likely to seek medical advice, only 27.4% of them sought medical advice for PD, which is consistent with the reported rate of 20.8% in Taiwan.³⁹ The reluctance of girls to seek medical advice for PD suggests that girls have incomplete or incorrect knowledge of dysmenorrhea and consequently suffer unnecessary pain. Girls who were medical majors in this study reported seeking medical advice less frequently than girls who were non-medical majors. This may be related to the fact that they have more opportunities to obtain medical advice, such as from their parents or teachers and, being student doctors, they may be more reliant on their medical knowledge of PD. Girls who did not know whether their mothers had PD might not have talked with their mothers about this condition, and girls who negatively communicated this condition with others might have negative attitudes towards adopting any other self-care strategies for PD. A solution to these would be to encourage girls to discuss PD openly and seek medical advice.

Strengths and limitation

The results of this study on the prevalence of PD, characteristics of PD and self-care strategies for managing PD are useful for assessing the burden of dysmenorrhea in the Chinese college girls and for planning and allocating health resources. The sample of this study was sufficiently large and randomly collected; thus, it was representative of the target population of the Chinese college girls. However, the study has a few limitations. First, the senior classes were not included in the study, resulting in a small sample size for the 22–23 age group. Therefore, the prevalence of PD in this age group needs further verification. Second, PD screening, characteristics of PD and self-care strategies used for PD were only based on self-reports, which might not be accurate. Finally, there is a possibility of bias in the outcome measures if the 41 girls who were absent from school during the investigation period had different characteristics than those who were available and participated in the study. Future studies based on daily recording of dysmenorrhea are required to gain accurate information and understanding of the dynamic changes in PD.

CONCLUSIONS

This study revealed that approximately half of the college girls in this Chinese sample experienced PD, and approximately one-third experienced moderate to severe pain. Chinese college girls are likely to reduce physical activity, keep warm, communicate dysmenorrhea with friends or mothers, drink warm beverages, avoid cold drinks and foods, use heat therapy and engage in self-talk for managing the menstrual pain and discomfort, but most

of them did not self-medicate, or seek medical advice for managing PD. There were large variations in the frequencies with which the various self-care strategies were used for managing PD by girls of different ages, BMIs, ethnicities, majors and severities of pain. Therefore, more culturally appropriate interventions that aim to promote self-care among Chinese girls with PD are needed. Intervention strategies should be designed specifically for different age groups, BMIs, ethnicities, majors and, especially, severities of pain.

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