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Current State of College Women's Coping Behaviors against Peri-menstrual Symptoms and Educational Challenges in Thailand

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Abstract

Backgrounds: Many women suffer from peri-menstrual symptoms. This study focused on the acceptance of menstruation and assessed coping methods from both the physical and mental aspects.

Methods: Female college students (n=122) were recruited from the Faculty of Nursing, Chiang Mai University. Subjects responded to a survey consisting of questionnaires about their menstruation, peri-menstrual symptoms, and coping behaviors (examples, satisfaction), and three psychometric measurements (State Trait Anxiety Inventory (STAI), Generalized Self-Efficacy Scale, and the Tri-Axial Coping Scale). Also, 25 subjects suffering from premenstrual syndrome (PMS) and 25 non-PMS subjects were investigated in terms of the activity of the autonomic nervous system (ANS) using heart rate variability and the cold pressor test. These surveys were conducted twice: once before and once after ovulation.

Results: The subjects who had severe menstrual problem showed significantly low satisfaction with their coping behaviors. About half of the subjects were not satisfied with their coping behaviors because they need more practical information about methods of coping. In the secretory phase, there was no significant difference in levels of coping satisfaction. However, Low satisfied group showed a relatively high STAI score and a low Self-Efficacy score. Additionally, the activated sympathetic nerves appeared to become dominant over the parasympathetic nerves in the secretory phase.

Conclusion: The severity of menstruation was correlated to low satisfaction with coping behaviors. This severity was affected by the cyclic change of menstruation and activity of the ANS. This study suggests providing more practical education for young women.

Keywords: Menstrual cycle; Coping behavior; Menstruation; Autonomic nervous system activity

Introduction

Most reproductive-age women experience various physical or psychological symptoms of menstruation, which occasionally disturb social activities including school, household activities, and interpersonal relationships [1,2]. Examples of peri-menstrual symptoms in adolescents include nervousness, fatigue, abdominal cramps, low back pain, anxiety, mood swings, and so forth [3,4].

It is known that many factors, such as educational qualifications [5], lifestyle [6,7], delivery experience [8], culture [9], stress [5], and educational background [10] can affect the expression and severity of peri-menstrual symptoms.

Previous research has highlighted what types of coping behaviors women usually use to cope with the menstruation, and demonstrated that their choices were very limited: i.e. they chose some negative way (e.g. do nothing), or restricted way (e.g. take pain medicine) [11]. Further, most of women complain about peri-menstrual symptoms, however they do not acquire sufficient knowledge of menstruation because of a lack of menstrual education [12]. Such deficiency in knowledge of menstruation may result in unsatisfied coping behaviors [13].

On the other hand, peri-menstrual symptoms (e.g. depression, irritability, edema, abdominal pain, headache, chilliness) are very similar to those of dysautonomia. The dysfunction of the autonomic nervous system (ANS) is one of the major causes for severe menstrual symptoms.

It is a fact that women have to live with menstruation for a long time. We assumed that if they have positive recognition of menstruation, they could cope with the symptoms effectively. However, there are no reports demonstrating the effectiveness and appropriateness of coping behaviors against menstrual symptoms in young women using physical and psychological state assessments.

Thus, we conducted the present study to examine coping behaviors against peri-menstrual symptoms and rates of satisfaction, and the relation between coping behaviors and ANS activity/mental state.

Materials and Methods

Subjects

We recruited 135 first year female students from the Faculty of Nursing, Chiang Mai University, who were living in dormitories

within the campus. Firstly, we described the purpose of this research and that survey data would be collected and used anonymously. After received their consents, we distributed the questionnaires during class. We also settled some exclusion criteria: subjects who use the pills, takes steroids or psychological drugs, or who suffer from thyroid disease or diabetes mellitus. No subjects met those criteria in this study. We considered that subjects who responded to both questionnaires were valid respondents, and there were 122 such students (90% response rate). Permission was obtained from the ethical committee of Faculty of Nursing, Chiang Mai University and Kobe University.

Methods

Questionnaires

The self-reported questionnaires consisted of several parts: demographics information (age, religion, weight), menstrual information (cycle, symptoms, Premenstrual syndrome (PMS), Dysmenorrhea), educational background concerning menstruation, support for coping with menstruation, coping against menstruation, and assessment of chilliness and migraine without aura. We used the Japan Society of Obstetrics and Gynecology (JSOG)'s criteria when we diagnosed PMS and dysmenorrhea. When the subjects had one or more symptoms and these symptoms disturbed their Quality of Life (QOL), and those symptoms occurred in the 3-10 days before the period and end or decline at its start, it was diagnosed as PMS. If symptoms occurred during menstruation, it was diagnosed as dysmenorrhea. In addition, chilliness and migraine without aura were diagnosed using Terasawa's diagnostic criterion [14], and the International Classification of Headache Disorders; 3rd Edition (ICHD-3) [15] respectively. We also used three psychometric scales (State Trait Anxiety Inventory (STAI), Generalized Self-Efficacy Scale, and Tri-Axial Coping Scale (TAC-24)), and then evaluated the change of psychological state related to the menstrual cycle. We performed them twice in the proliferative and secretory phases of menstruation. We used the Thai language version of the questionnaires, which were translated by the nursing stuff of Chiang Mai University from the English version we had created.

From the results of the first questionnaire, we selected each 25 subjects of PMS and non-PMS (N-PMS) groups for comparison, by using stratification sampling in three BMI groups: <18.5, 18.5-25.0, and >25.0.

Psychometric assessments

Thai version State-Trait Anxiety Inventory (STAI)

We used it in order to measure the anxiety level among the subjects. STAI comprises 40 -items that assess both anxiety as an emotional state and individual differences in anxiety as a personality trait.

Generalized Self-Efficacy Scale

This is the Japanese version of Sherer et al. Self-Efficacy Scale [16] which was developed by Narita et al.[17] It consists of 23 -items and assesses the general self-efficacy, which explains a broader range of human behaviors and coping outcomes when the context is less specific [18]. We used a version that had been translated into the Thai language

Tri-Axial Coping Scale (TAC-24)

This is a self-report measure developed by Kamimura et al., as a means to evaluate a person's tendencies to adopt certain coping strategies (coping style) [19]. This questionnaire consists of 24 -items divided into eight sub-scales (getting information, giving up, positive interpretation, plan drafting, avoidance-like thinking, distractive recreation, catharsis, evading one's responsibility). In this study, we also used Thai language version, and analyzed four sub-scales (catharsis, giving up, getting information, and plan drafting) that had sufficiently high Cronbach's alpha reliability coefficients (catharsis: 0.82 and 0.86, giving up: 0.65 and 0.73, getting information: 0.61 and 0.68, and plan drafting: 0.68 and 0.62).

Measurement of ANS activity

Heart Rate Variability analysis

After five minutes of supine rest, recordings were obtained for the immobile participants using an ECG Model FX-7302 (Fukudadenshi Inc., Kobe, Japan) for two minutes of spontaneous respiration without conversation. We performed frequency analysis using the Lab VIEW fast Fourier transformation program (National Instruments Corporation, TEX, USA) and calculated low-frequency (LF, 0.04-015Hz) and high-frequency (HF, >0.15Hz) components from the data. LF is considered to be a marker of both sympathetic and parasympathetic modulation. HF is generally defined as a marker of parasympathetic modulation. The ratio between the powers of LF and HF components (LF/HF ratio) was calculated to evaluate sympathetic nerve activity.

Cold pressor test

After the subjects spent twenty minutes in the room to adapt to the ambient temperature, we checked the skin temperature with an infrared thermometer (IT-550, HORIBA, Tokyo, Japan) at the first joint of the recessive hand's index finger. Then, the subjects were asked to immerse that one hand to just above the wrist for thirty seconds in ice water that was being kept at 4. After the hand was removed from the ice water, we immediately measured the skin temperature again. We continued recording in every one minute for ten minutes to evaluate the recovery.

We performed these ANS activity measurements on PMS and N-PMS subjects. Finally, we analyzed 38 subjects using HRV and 42 subjects using the cold pressor test. They were examined twice: before and after ovulation. The experimental preparation took place in a quiet room with an ambient temperature of about 25 and we did this twice (before and after ovulation) at the same time of day. We also performed these examinations twice in both the proliferative and secretory phases to evaluate the change of ANS activity related to the menstrual cycle.

Statistical analyses

The data analyses were performed on the differences between the High satisfied group (consisting of "Satisfied" and "Almost satisfied" subjects) and Low satisfied group (consisting of "Unsatisfied" subjects), and the proliferative and secretory phases of menstruation. Fisher's exact test was used to determine the association between variables. To identify differences in one subject between menstrual phases, a paired t-test was used. Repeated-measures ANOVA was used to test the differences in phases between two different satisfaction groups. In all cases, P values of <0.05 were considered statistically

significant. SPSS Statistics version 22.0 software and R package were used for statistical analysis.

Results

Subject characteristics

Table 1 shows the characteristics of the subjects. The mean age was 19.0 ± 2.9 years (range 18-40). The mean age of menarche was 12.5 ± 1.1 years (range 9-16). 80 subjects (65.6%) had regular menstrual cycle (25-38 days) and 121 subjects (99.2%) had regular menstrual period (3-7 days).

Variable	Mean ± SD or number (%)
Age (years)	19.0 ± 2.9
Height (cm)	159.8 ± 5.6
Weight (kg)	51.0 ± 7.3
Body mass index (kg/m2)	19.9 ± 2.4
Religion	
Buddhist	115 (94.3)
Christian	6 (4.9)
Muslim	1 (0.8)
Age of menarche (years)	12.5 ± 1.1
Menstrual cycle	
24days	19 (15.6)
25-38days	80 (65.6)
Don't know	21 (17.2)
Length of duration	
2days	0 (0.0)
3-7days	121 (99.2)
8days	1 (0.8)
SD, standard deviation	

Table 1: Characteristics of subjects (n=122)

The prevalence of peri-menstrual symptoms

In all 122 subjects, the most common premenstrual symptoms in all 122 subjects were acne (80.2%, n=97), irritability (68.6%, n=83), breast tenderness (54.5%, n=66), food craving (50.4%, n=61), and abdominal pain (43.8%, n=53), and the most common menstrual symptoms were abdominal pain (68.6%, n=83), acne (59.5%, n=72), irritability (55.4%, n=67), and fatigue/low back pain (38.0%, n=46).

The prevalence of PMS, dysmenorrhea, migraine without aura, and chilliness

Out of 122 subjects included in this study, 25 subjects (20.5%) met the criteria of PMS and 59 subjects (48.4%) met the criteria of dysmenorrhea. Also 6 (4.9%) and 20 (16.0%) subjects met the criteria of migraine without aura and chilliness. Out of those migraine and chilliness subjects, 2 of the migraine subjects (33.3%) and 6 of chilliness subjects (30.3%) also met the criteria of PMS.

Knowledge of menstruation

With regards to knowledge of menstruation, 86.1% chose "teacher" and 74.3% chose "mother" as the main educator who taught them menstrual knowledge (n=101). For the satisfaction with their menstrual knowledge, 20.5% and 73.0% of subjects were "very satisfied" and "satisfied" (n=122). In practice, the subjects learned, for instance, information about sanitary napkins (e.g. changing time or purpose of use, 71.9%), hygienic information (e.g. how to prevent infections, 45.8%), advice of self-care or daily life (e.g. how to cope with abdominal pain, 32.7%), information about nutrition (e.g. avoid drinking coconut juice, 15.9%), and mechanism or basic information about menstruation (e.g. why the symptoms occurred, 13.1%) (n=107). On the other hand, the subjects wanted to learn more about the following: self-care information (e.g. how to prevent infections, 38.8%), normal and abnormal menstruation: 25.4%), hygiene information, 11.9%), and information about nutrition, 4.5%) (n=67).

Coping behavior and satisfaction

The percentage of coping behaviors is shown in (Table 2). The second most common item was "Just tolerate" (59.5%). The reasons why this was chosen were "Symptoms are not so serious." (68.7%), "Menstruation is not illness, and so I cannot be helped." (26.9%), or "It has no effect." (4.5%). Furthermore, 42.6% and 5.7% of the subjects were included in "Somewhat unsatisfied" or "Unsatisfied" group in their coping behaviors. The reasons for "Unsatisfied" were the following: "It doesn't work."(42.9%), "I don't know whether it is correct or not." (42.9%).

A. Coping behaviors against peri-menstrual symptoms		B. Satisfaction with coping behaviors	
Variable	Number (%)	Variable	Number (%)
Take a rest	90 (74.4)	Satisfied	3 (2.5)
Just tolerate	72 (59.5)	Almost satisfied	57 (46.7)
Use painkiller	61 (50.4)	Somewhat unsatisfied	52 (42.6)

Warm yourself	40 (33.1)	Unsatisfied	7 (5.7)
Consume sufficient nutrition	37 (30.6)	Don't do anything	3 (2.5)
Moderate activity	36 (29.8)		
Massage	7 (5.8)		
Stretch	4 (3.3)		
See to a doctor	4 (3.3)		
Absent from school	3 (3.3)		
Use supplement	1 (0.8)		
Other	1 (0.8)		

Table 2: Coping behaviors

Relationship between severity of menstruation and satisfaction with coping behaviour

To evaluate the effect of satisfaction on health difficulties, we compared the prevalence of health difficulties between two satisfaction level groups with Fisher's exact test (Table 3). As a result, the percentage of subjects who have low satisfaction with coping behavior in PMS and dysmenorrhea groups was significantly higher as compared to high satisfaction level subjects. There were no significant differences in satisfaction level between the presence and absence of migraine without aura and chilliness. Moreover, the percentage of low satisfaction level group was significantly higher in cases that had multiple health difficulties compared with those who had no or single health difficulties.

Variable	Satisfaction with coping behaviorsb		P-valuea
	Low (n=7)	High (n=60)	
PMS status			
PMS	5 (35.7)	9 (64.3)	0.003
N-PMS	2 (3.8)	51 (96.2)	
Dysmenorrhea status			
Dysmenorrhea	6 (19.4)	25 (80.6)	0.043
N-Dysmenorrhea	1 (2.8)	35 (97.2)	
Migraine without aura			
Yes	1 (20.0)	4 (80.0)	0.434
No	6 (9.7)	56 (90.3)	
Chilliness			
Yes	0 (0.0)	11 (100.0)	0.589
No	7 (12.5)	49 (87.5)	
Number of disordersc			
0	1 (2.4)	41 (97.6)	
1	1 (11.1)	8 (88.9)	0.005
2-3	5 (31.3)	11 (68.8)	

Table 3: Relationship between severity of menstruation and satisfaction with coping behaviors, aP-values represent Fisher's exact test. Other values are numerical (%)., bLow satisfaction group consists of "Unsatisfied" subjects, and High satisfaction group consists of "Satisfied" and "Almost satisfied" groups., N-PMS, Non PMS; N-Dysmenorrhea, Non dysmenorrhea., cdisorders means all PMS, dysmenorrhea, migraine without aura, and chilliness.

Satisfaction with coping behavior and the scores for STAI, Generalized Self-Efficacy Scale, and TAC-24

Repeated-measures ANOVA was used to examine differences among the three psychometric tools over time for the menstrual phase and satisfaction with coping behavior (Table 4). There were no significant differences. However, the STAI state score in low satisfaction was somewhat higher, and the score of Self-efficacy in low satisfaction was somewhat lower in the secretory phase.

Psychometric tools and phase	Satisfaction with coping behaviorsb		P-valuea
	Low	High	
STAI State			
Proliferative	41.0 ± 5.2	40.4 ± 5.8	N.S.
Secretory	43.0 ± 6.0	40.6 ± 6.8	

STAI Trait			
Proliferative	41.0 ± 1.6	40.9 ± 4.3	N.S.
Secretory	40.6 ± 3.6	40.0 ± 4.8	
Self-Efficacy			
Proliferative	81.0 ± 4.1	82.2 ± 8.8	N.S.
Secretory	77.4 ± 4.3	82.8 ± 8.4	
TAC-24: C1 (Catharsis)			
Proliferative	10.5 ± 1.0	11.2 ± 2.3	N.S.
Secretory	11.3 ± 1.4	10.7 ± 2.5	
TAC-24: C2 (Giving up)			
Proliferative	7.5 ± 1.8	6.7 ± 2.2	N.S.
Secretory	7.5 ± 1.9	6.8 ± 2.4	
TAC-24: C3 (Getting information)			
Proliferative	9.5 ± 1.0	10.0 ± 1.7	N.S.
Secretory	9.0 ± 1.7	9.1 ± 2.0	
TAC-24: C7 (Plan drafting)			
Proliferative	9.8 ± 1.6	11.0 ± 1.8	N.S.
Secretory	9.5 ± 1.4	10.8 ± 2.0	

Table 4: The relationship between satisfaction of coping behaviors and STAI, Generalized Self-Efficacy Scale, and TAC-24, aP-values represent repeated measure ANOVA. Other values are mean ± standard deviation., bLow satisfaction group consists of "Unsatisfied" subjects, and High satisfaction group consists of "Satisfied" and "Almost satisfied" groups., Number of subjects in each psychometric assessment are; STAI (Low=5, High=42), Generalized Self-Efficacy Scale (Low=5, High=46), and Tri-Axial Coping Scale (Low=6, High=46)., N.S.; not significant.

ANS activity measurements

Table 5 shows the mean differences in some examination indexes of HRV and the cold pressor test, which were evaluated with a paired t test. Low Frequency (LF), High Frequency (HF), Total Power, and LF HF ratio (LF/HF) are the HRV indexes, while Before loading (), Directly after changing rate (°C), 5 min after recovery rate (), and 10 min after recovery rate () are the indexes of the cold pressor test. HF and Total Power in the proliferative phase were significantly ($P<0.05$) higher than those in the secretory phase. There were no significant differences in the results of the cold pressor test. We also examined differences among these indexes over time for the menstrual phase and satisfaction with coping behavior, but there were no significant differences.

	Phase		
Variable	**Proliferative**	**Secretory**	**P-valuea**
HRV (N=38)			
LF (ms2/Hz)	748.6 ± 77.06	656.8 ± 698.4	0.403
HF (ms2/Hz)	1363.9 ± 1294.1	1003.0 ± 997.8	0.016
Total Power (ms2/Hz)	2112.5 ± 1892.7	1659.8 ± 1527.8	0.039

LF/HF	0.7 ± 0.7	0.7 ± 0.5	0.921
Cold pressor test (N=42)			
Before loading (°C)	29.4 ± 2.3	29.0 ± 2.9	0.52
Directly after changing rate (%)	-33.2 ± 5.8	-33.1 ± 5.9	0.935
5min after recovery rate (%)	38.7 ± 30.5	37.4 ± 29.2	0.839
10min after recovery rate (%)	60.1 ± 36.7	62.0 ± 35.0	0.779

Table 5: Change of autonomic nervous system activity in proliferative and secretory phase, aP-values represent paired t-test., HRV, heart rate variability; LF, low frequency; HF, high frequency

Discussion

The goals of this study were twofold. The first was to examine the coping behaviors against peri-menstrual symptoms and their rates of satisfaction. The second was to investigate the relation between coping behaviors and ANS activity/mental state. Several important conclusions were derived from the findings in this study. First, the severity of menstruation affected the satisfaction with coping

behaviors. Second, the menstrual cycle variation affected the severity of menstruation through the modification of ANS activity.

In this subjects group, there were students suffering from PMS, dysmenorrhea, migraine without aura, and chilliness. The prevalence of PMS, dysmenorrhea and migraine without aura were similar to other research [20-22]. On the other hand, the prevalence of chilliness in this group was fewer.14 In Thailand, the concept of chilliness is not widely acknowledged. Furthermore, this chilliness criterion is referred to in some questions, and reflects in Japanese culture. Therefore these questions may not be suitable for the subjects here.

These subjects tended to choose some limited coping means, especially "Take a rest," "Just tolerate," and "Use a painkiller," were very popular. When we focused on the reason why they chose "Just tolerate," we could find those students may have giving up feeling against their symptoms. Almost half of subjects felt dissatisfied with their coping behaviors. Additionally, they need more information about self-care, so they may attempt to look for better coping behaviors. On the other hand, they showed high satisfaction with menstrual education. That is, in spite of the fact that most women sufficient occasions of menstrual educations, such education did not always lead to practical coping behaviors. Furthermore, they consider mother and teacher as the key persons in menstrual education. Therefore we considered we should strive for improvement of menstrual education not only in school but also at home through these educational stakeholders.

In this study, severe cases, such as PMS and dysmenorrhea, or those who had multiple health difficulties were correlated with low satisfaction with coping behaviors. Some previous studies have confirmed that severity might be one of the causes of undertaking self-care directly [13,23]. We did not analyze the relationships between severity and coping behaviors. However, even if this is the case, such coping behaviors would not useful at this time. Therefore, focusing on satisfaction and evaluating the effectiveness of coping behaviors was extremely valuable for improvement of menstrual education. Our findings also indicate that the change of menstrual phases have a pivotal role in the severity of menstruation. In the secretory phase, HF and Total Power of ANS activity are significantly lower, also in the Low satisfaction group, the STAI state score is somewhat higher and the Self-Efficacy score is somewhat lower than those in proliferative phase. In previous research, HF and Total Power, which reflect parasympathetic and overall autonomic nerve activity, significantly decreased in the late luteal phase in the PMS group [24]. Furthermore, the result of the change in STAI state and Self-Efficacy scores suggest the worse mental state occurs in the secretory phase. PMS or Premenstrual Disphoric Disorders (PMDD) are representative examples of menstrual disorders and they show much more severe mental symptoms than the disorders during their period. Therefore, women's QOL might be reduced easily and significantly. We did not find any correlation between satisfaction with coping behaviors and change of mental state investigated with STAI and Self-Efficacy in this study. However, it is crucially important that we provide the information about the influence of the changes in menstrual phases for women. That would provide an opportunity for them to understand the physiological phenomena involved, and to gain greater power in coping.

Conclusion

In conclusion, our study subjects had various menstrual symptoms and attempted to cope with them. Their satisfaction with coping was not so high, and they required the chance to acquire more practical coping behaviors. Additionally, our study suggested that the imbalance of ANS activity is associated with the severity of peri-menstrual symptoms and its periodic change, and also with satisfaction with coping behaviors.

Our study has limitations. The total number of subjects was small and these subjects were nursing students so we cannot deny the possibility that medical knowledge may have affected the results marginally. Therefore, future study should be expanded to include other populations of Thai women.

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