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A study on dysmenorrhea in female undergraduate students at Mae Fah Luang University applying the Mahachotarat scripture of Thai traditional medicine

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Abstract

This study aimed to examine dysmenorrhea in terms of pain intensity, symptoms, and self-care techniques prior to and during the menstrual period applying the theory in the 'Mahachotarat' scripture of Thai traditional medicine. The participants were 382 female undergraduate students in the first semester of the academic year 2019 at Mae Fah Luang University, Chiang Rai, Thailand. The data were collected using survey questionnaires to assess the participants' feeling of pain, symptoms based on the Mahachotarat scripture, and self-care techniques to reduce the severity of symptoms prior to and during their menstrual period. According to the findings, a majority of the participants experienced mild to perceptible pain *prior to* and *during* their menstrual period accompanied by mood(heart)-related symptoms (71.0% and 71.5%), followed by tendon-related symptoms (65.7% and 70.2%), emotion(bile)-related symptoms (55.2% and 53.7%), bone-related symptoms (51.8% and 53.1%), and skin-related symptoms (50.8% and 52.9%). In terms of their self-care techniques, most of the participants reported alleviating pain by practicing acupressure (88.7% and 86.9%), followed by refraining from taking analgesics (87.2% and 85.3%), massaging painful spots with a hot compress together with drinking a hot beverage (52.6% and 51.8%), and taking a rest (79.1% and 72.8%).

Keywords: Dysmenorrhea, theory of Thai traditional medicine, undergraduate students, mahachotarat scripture

Introduction

Menstruation is an experience that all women entering their teenage years or reproductive age go through. It is a natural developmental stage of the body that not only demonstrates the full-grown state of their genital organ but also results in their physical, mental, emotional, and behavioral changes both prior to and during the menstrual period.

Premenstrual syndrome, otherwise referred to as PMS, is a combination of symptoms the onset of which falls one to two weeks prior to the menstrual period normally following ovulation. According to Mahvash et al. (2012) and Lefebvre et al. (2013), common symptoms are dysmenorrhea, including stomachache and/or backache characterized by sharp, cramping, throbbing and/or dull pain above the pubic or groin area or the lower back possibly radiating to the inner thigh, headache, exhaustion, nausea and dizziness, weight gain, edema, breast engorgement and pain, increased appetite, flatulence, liquid bowel movements, acne vulgaris, and emotional changes, such as irritability, stress, anxiety, amnesia, attention deficit, sorrow, and insomnia. Such manifestations will subside a few days after menstruation starts and in the event that they are severe, may last for 48-72 hours (Mahvash et al., 2012; Lefebvre et al., 2013).

Dysmenorrhea can be classified into two types: primary and secondary. Primary dysmenorrhea is a negative pain caused by uterine contractions often experienced six to 24 months after the first menstrual cycle, otherwise referred to as menarche. This type of dysmenorrhea normally begins one day prior to menstruation and continues for a few days before diminishing in intensity. In comparison, secondary

dysmenorrhea is often felt by women aged over 25 years more than two years after their first menstruation and accompanied by pelvic conditions (Lacovides et al., 2015).

The first menstrual cycle usually takes place at the age of 12 to 14 years with dysmenorrhea experienced for the first time at the age of 13 years (Chiou & Wang, 2008). The most cited symptoms prior to menstruation are breast engorgement, pubic pain, acne vulgaris, and backache, the intensity of which ranges from mild to severe and lessens over time, while the most common symptoms during menstruation are pubic pain and breast engorgement (Yongvanich, 2005). Among female university students, the prevalence of dysmenorrhea is as high as 70-90% (Yongvanich, 2005; Parai, 2012; Tangchai, 2004).

To alleviate dysmenorrhic symptoms prior to and during menstruation, several self-care techniques are recommended, including the use of medication, such as NSAIDs, paracetamol, or contraceptives (De Sanctis, 2015; Ortiz, 2010), and the application of alternative, non-medicinal therapies, such as massaging painful spots with a hot compress and exercise (Midilli, 2015). Most females suffering from dysmenorrhea have been reported to opt for such pain relief strategies as having hot drinks, practicing self-massage or acupressure, doing aerobic or yoga exercise, and resting (Hong, 2005; Dittakarn, 2004).

In the 'Mahachotarat' scripture of Thai traditional medicine, 'Lohit Prakruti Dosh' (the Roman transcription of the Sanskrit origin of the term) refers to undesirable symptoms experienced by females prior to and during every menstrual cycle, such as pubic cramps, irritability, fever or fever with chills, hot flashes, rashes, headache, spinal or joint pain, and liquid bowel movements, which gradually decline and disappear. According to the Mahachotarat scripture, such symptoms can be divided into five types: mood(heart)-related, emotion(bile)-related, skin-related, tendon-related, and bone-related (Subcharoen, 2003). Mood(heart)-related symptoms include anxiety, irritability, grumpiness, and overreaction. Emotion(bile)-related symptoms include fever, obsession, delusion, and hysteria. Skin-related symptoms include hot flashes, rashes, and flush. Tendon-related symptoms include fever, fever with chills, and severe headache. Bone-related symptoms include ostealgia, arthralgia, and back pain.

It is evident that dysmenorrhea is a complex condition caused by several factors and associated with various intensity levels. For this reason, dysmenorrhea may be left unaddressed as it is perceived to be part of females' experience despite its adverse impacts on their concentration, academic performance, ability to perform daily activities, and, most importantly, professional and social life. To improve their quality of life, it is, therefore, vital to develop a deeper understanding of the severity of dysmenorrhea prior to and during their menstrual period, their self-care behavior during menstruation, causes of dysmenorrhea, factors affecting dysmenorrhea, and guidelines for alleviating dysmenorrhea taking a medicinal and/or a non-medicinal approach.

Research objectives

1. To assess the pain intensity levels felt by the participants prior to and during the menstrual period
2. To evaluate their symptoms prior to and during the menstrual period based on the Mahachotarat scripture
3. To examine their self-care techniques prior to and during the menstrual period and the effectiveness of such self-care techniques in alleviating pain

Materials and Methods

The present research was a survey study approved by the Mae Fah Luang University Ethics Committee on Human Research (EC20170-25). To protect their rights, the participants were informed of

the research objectives, encouraged to inquire about the project, notified of their eligibility to withdraw from their participation in the study at any point at their discretion without any negative consequences on their study or academic results, assured of the confidentiality of their personal information, and requested to sign the consent form.

Population, sample, and sampling technique

The population was 8,899 female undergraduate students from 13 schools at Mae Fah Luang University, Chiang Rai, Thailand. The sample comprised 383 female undergraduate students in the first semester of the academic year 2019 selected using a stratified random sampling method at the ratio of 1:25, divided into six from the School of Science, 26 from the School of Liberal Arts, 122 from the School of Management, 15 from the School of Information Technology, 4 from the School of Medicine, 8 from the School of Agro-Industry, 36 from the School of Law, 21 from the School of Cosmetic Science, 22 from the School of Health Science, 21 from the School of Nursing, 4 from the School of Dentistry, 21 from the School of Integrative Medicine, and 5 from the School of Social Innovation.

Instrument and validation of the instrument

The research instrument was a survey questionnaire comprising four sections. The first was made up of 20 questions regarding the participants' demographic information, such as age, height, weight, history of menstruation, and eating, drinking, and exercise behavior. The second was a visual analog scale (VAS) used to assess their feelings of pain with the ratings spanning across a continuum of 0 (none) to 10 (agonizing). The third consisted of 18 questions concerning their symptoms based on the Mahachotarat scripture of Thai traditional medicine, divided into mood(heart)-related, emotion(bile)-related, skin-related, tendon-related, and bone-related manifestations (Suncharoen, 2003). The last was made up of six questions relating to their self-care techniques to alleviate menstrual pain.

To ensure its validity and reliability, the questionnaire was evaluated by three experts. The item-objective congruence scores ranged from 0.82 to 1.00. Subsequently, the questionnaire was trialed on an independent cohort of 30 female undergraduate students at Mae Fah Luang University whose demographic characteristics resembled those of the participants of this study. The Cronbach's alpha correlation coefficient stood at 0.80.

Data collection

The Office of the Registrar of Mae Fah Luang University was contacted for access to the information regarding female undergraduate students in the academic year 2019. From this population, the participants were selected using a stratified random sampling method at the ratio of 1:25. Then they were approached, introduced to the research, walked through important issues, such as the eligibility to withdraw from their participation and confidentiality, and requested to sign the consent form prior to the beginning of the study. To

obtain the responses that best reflect their physical, mental, and emotional conditions, the participants were encouraged to complete the questionnaire prior to or during their menstrual period. The data collection took place during February and March 2019.

Data analysis

The data were analyzed using descriptive statistics and the paired t-test with the statistical significance set at 0.05.

Results

The present study investigated dysmenorrhea in female university students at Mae Fah Luang University, Chiang Rai, Thailand, in terms of pain intensity, symptoms, and self-care techniques prior to and during the menstrual period applying the Mahachotarat scripture of Thai traditional medicine. A total of 328 participants took part in the research. A majority of them were aged 20-21 (54.4%) with a healthy BMI in the range of 18-22.99 (72.2%). Most had their first menstruation at the age of 13-15 years (73.8%). Slightly over half of them reported having irregular menstruation (51.0%), drinking one to two cups/cans/bottles of tea on a daily basis (51.8%), and doing no workout (51.6%). Almost two-thirds experienced irritable feelings prior to and/or during their menstrual period (61.5%). The findings are displayed in Table 1.

Table 1. Demographic characteristics of the participants

Demographic characteristics	**Frequency**	**Percentage**
Age		
18 – 19	67	17.5
20 – 21	208	54.4
22 – 23	107	28.0
Body mass index (BMI)		
Underweight) <18.0)	31	8.1
Healthy (18.5 – 22.99)	276	72.2
Slightly overweight (23.0 – 24.90)	49	2.3
Overweight (24 – 29.90)	19	4.9
Obese) >30.0)	4	1.0
Age of menarche		
10 – 12	85	22.3
13 – 15	282	73.8
>15	15	3.9
Menstrual cycle		
Irregular	195	51
<21 days	58	15.2
22 – 28 days	81	21.2
>29 days	48	12.6
Tea drinking behavior		
Non-drinker	166	43.5
One to two cups/cans/bottles per day	198	51.8
Three to four cups/cans/bottles per day	15	3.9
>Five cups/cans/bottles per day	3	0.8

Coffee drinking behavior		
Non-drinker	244	64.4
One to two cups/cans/bottles per day	117	30.6
Three to four cups/cans/bottles per day	18	4.7
>Five cups/cans/bottles per day	3	0.8
Exercise behavior		
No exercise	197	51.6
Once to twice per week	77	20.2
Three to four times per week	100	26.2
>Five times per week	10	2.6
Emotional state		
Dispirited	97	25.4
Irritable	235	61.5
Ill-tempered	50	13.1

One to two days prior to their menstrual period, over one-third of the participant felt perceptible pain (40.3%), followed by those experiencing mild pain (39.0%), as shown in Table 2. A majority of them reported having mood(heart)-related symptoms, mostly irritability (73.0%) and feelings of discomfort (68.1%), followed by tendon-related symptoms, mostly myalgia (65.7%) and backache (62.6%), and emotion(bile)-related symptoms, mostly drowsiness (55.2%) and anxiety (51.0%), as illustrated in Table 3. As regards their self-care techniques, almost all participants practiced acupressure to alleviate pain (88.7%), followed by massaging painful spots with a hot compress together with drinking a hot beverage (52.6%) and having a rest (29.1%), as displayed in Table 4.

In comparison, during their menstrual period, a greater percentage of the participants sensed perceptible pain (45.8%), while a lower percentage felt mild pain (30.9%) and moderate pain (18.1%), as illustrated in Table 2. Different from their pre-menstrual experience, most of the participants reported having tendon-related symptoms, mostly myalgia (70.2%), pubic cramps (67.5%), and backache (62.8%), followed by emotion(bile)-related symptoms, mostly anxiety (53.9%) and drowsiness (53.7%), and bone-related symptoms, mostly lethargy (53.1%) and lumbago (50.8%), as displayed in Table 3. However, somewhat similar to their pre-menstrual self-care techniques, more participants still opted for acupressure (86.9%), followed by having a rest (72.8%) and massaging painful spots with a hot compress together with drinking a hot beverage (51.8%), as shown in Table 4.

Table 2. Pain intensity prior to and during the menstrual period assessed with the VAS

Pain intensity levels	**Prior to the menstrual period**		**During the menstrual period**	
	Frequency	**Percentage**	**Frequency**	**Percentage**
None	21	5.5	10	2.6
Mild	149	39.0	118	30.9
Perceptible	154	40.3	175	45.8
Moderate	47	12.3	69	18.1
Severe	9	2.4	8	2.1

Agonizing	2	0.5	2	0.5

Table 3. Symptoms prior to and during the menstrual period based on the Mahachotarat scripture of Thai traditional medicine

Symptoms	**Prior to the menstrual period**		**During the menstrual period**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Mood(heart)-related				
Irritability	73.0	27.0	71.5	28.5
Sleeplessness	24.1	75.9	24.3	75.7
Feelings of discomfort	68.1	31.9	70.9	29.1
Infraorbital darkening	10.7	89.3	6.3	93.7
Emotion(bile)-related				
Fever	20.9	79.1	26.4	73.6
Drowsiness	55.2	44.8	53.7	46.3
Somnambulism	25.1	74.9	21.7	78.3
Anxiety	51.0	49.0	53.9	46.1
Skin-related				
Fever/Headache/Conjunctivitis	50.8	49.2	52.9	47.1
Dermatitis	30.6	69.4	31.4	68.6
Edema	47.1	52.9	43.7	56.3
Tendon-related				
Myalgia	65.7	34.3	70.2	29.8
Backache	62.6	37.4	62.8	37.2
Pubic cramps	61.0	39.0	67.0	33.0
Bone-related				
Lethargy	51.8	48.2	53.1	46.9
Fever with chills	45.0	55.0	44.2	55.8
Lumbago	46.1	53.9	50.8	49.2
Arthralgia and ostealgia	44.5	55.5	47.9	52.1

Table 4. Self-care techniques prior to and during the menstrual period

Self-care techniques	**Prior to the menstrual period**		**During the menstrual period**	
	Yes (%)	**No (%)**	**Yes (%)**	**No (%)**
Taking modern medicine	12.8	87.2	14.7	85.3
Opting for alternative medicine	1.8	98.2	1.8	98.2
Using dietary supplements	8.1	91.9	8.9	91.1
Sleeping/Resting	29.1	70.9	72.8	27.2
Massaging painful spots with a hot compress together with drinking a hot beverage	52.6	47.4	51.8	48.2

Practicing acupressure	88.7	11.3	86.9	13.1

A comparison of pain intensity prior to and during the menstrual period reported by the participants indicated that the latter was faintly yet significantly higher than the former at $p<0.05$, as illustrated in Table 5. A further exploration into their symptoms applying the Mahachotarat scripture of Thai traditional medicine revealed significantly greater severity during the menstrual period only for fever and backache, which were manifestations of emotion(bile)- and tendon-related symptom, respectively, at $p<0.05$, as displayed in Table 6.

Table 5. Paired t-test results of pain intensity prior to and during the menstrual period assessed with the VAS

Pain intensity assessed with the VAS	**Prior to the menstrual period**	**During the menstrual period**	**95% CI of the difference**	**p-value**
Visual analog scale	2.69±0.92	2.88±0.84	3.67(0.28-0.08)	0.001

* Significant at $p<0.05$

Table 6. Paired t-test results of the symptoms prior to and during the menstrual period based on the Mahachotarat scripture of Thai traditional medicine

Symptoms	**Prior to the menstrual period**	**During the menstrual period**	**95% CI of the difference**	**p-value**
Irritability	1.38±0.68	1.42±0.72	1.19(0.10- 0.02)	0.232
Sleeplessness	4.99±2.86	5.04±2.91	0.37(0.31-0.21)	0.709
Feelings of discomfort	8.50±1.64	8.55±1.56	0.81(0.18-0.07)	0.416
Infraorbital darkening	8.97±0.36	8.99±0.25	1.00(0.03-0.01)	0.318
Fever	2.33±1.31	2.20±1.24	2.61(0.03-0.22)	0.008*
Drowsiness	6.34±2.75	6.16±2.74	1.41(0.06-0.40)	0.159
Somnambulism	8.72±1.14	8.77±1.04	1.10(0.15-0.04)	0.271
Anxiety	9.00±0.00	8.99±0.25	1.00(0.01-0.03)	0.318
	1.82±1.25	1.79±1.25	1.03(0.03-0.09)	0.303
Fever/Headache/Conjunctivitis				
Dermatitis	7.21±2.78	7.31±2.76	0.65(0.38-0.19)	0.513
Edema	8.94±0.61	8.84±0.95	1.60(0.02-0.21)	0.109
Myalgia	1.47±0.78	1.41±0.76	1.82(0.00-0.12)	0.069
Backache	4.76±3.15	4.38±3.06	2.40(0.06-0.69)	0.017*
Pubic cramps	7.39±2.65	7.18±2.76	1.63(0.04-0.46)	0.104
Lethargy	1.73±0.93	1.68±0.83	1.11(0.04-0.14)	0.264
Fever with chills	5.08±2.82	4.87±2.73	1.55(0.05-0.47)	0.120
Lumbago	8.03±2.07	7.88±2.18	1.23(0.08-0.38)	0.218
Arthralgia and ostealgia	8.87±0.79	8.78±1.03	1.70(0.01-0.19)	0.090

* Significant at $p<0.05$

Discussion

The present study revealed that the participants went through mild to perceptible pain accompanied by several symptoms prior to and during their menstrual period. This finding is consistent to that reported in Youngwanichsetha (2005) and Chiou & Wang (2008), which similarly investigated participants in their late teenage years having their menarche at 13-15 years of age. According to Thai traditional medicine, menstruation and accompanying symptoms are attributable to females' physical changes starting off from age 13-15, such as the increased functions of the fire and wind elements in their body, which results in full development of their genital organs (Subcharoen, 2003).

As for mood(heart)- and emotion(bile)-related symptoms based on the Mahachotarat scripture of Thai traditional medicine, the participants admitted feeling irritable both prior to and during their menstrual period. Such a finding agrees with that found by Derman (2004), which attributed irritability to stress. In addition, the participants reported feelings of discomfort both prior to and during their menstrual period. Prolonged physical discomfort has been demonstrated to be a cause of anxiety, which, in severe cases, can lead to depression, particularly during the menstrual period (Christensen, 2011; Freeman, 2003).

In terms of tendon- and bone-related symptoms, the participants experienced myalgia, backache, pubic cramps, and lumbago both prior to and during their menstrual period. One explanation for this is the production of excessive E_2 and F_2 prostaglandin alpha (Lefebvre et al., 2013). As this causes the uterus to contract and the lining of the uterus to detach from its walls, pain or ischemia follows. Additionally, the level of E_2 and F_2 prostaglandin alpha peaks during the first 24 hours of a menstrual cycle, so pain from backache, lumbago, and pubic cramps, originating above the pubic area and sometimes radiating to the thighs and the back, are usually the most severe or even reach an intolerable level during this period (Lefebvre et al., 2013).

Regarding their self-care techniques prior to and during their menstrual period, most of the participants reported practicing acupressure. As a great number of studies show, acupressure stimulates nerve fibers in the skin, thereby stopping the transmission of pain signals to the medulla spinalis and the brain and inhibiting menstrual pain (Melzack, 1967). One research conducted on females suffering from primary dysmenorrhea demonstrated that pressing the SP6 acupoint fared well in relieving pain with the effect lasting for as long as three hours after the therapy (Neda, 2011). Similar results were also reported in Sullukkana (2017), which found that ear acupuncture in conjunction with moxibustion of the lower abdominal area slightly above the genitalia could effectively ease primary dysmenorrhea by promoting the hormonal balance and pelvic blood circulation and reducing blood coagulation and relaxing the uterus and ovary muscle tissues.

Another self-care technique that most of the participants resorted to was massaging painful spots with a hot compress together with drinking a hot beverage. The use of a hot compress has been shown to, at least temporarily, numb pain as effectively as NSAIDs and more effectively than acetaminophen, and the efficacy increased when it was administered in conjunction with NSAIDs (e.g. Akin, 2001). However, the participants in the present study relied more on alternative therapy whilst refraining from taking analgesics. Such a finding warrants further research in the light of contradictory results reported in Ortiz (2010), which discovered that almost three-fourths of the participants managed their pain with painkillers.

Conclusion

In this research, 382 female undergraduate students at Mae Fah Luang University, Chiang Rai, Thailand, were asked to respond to a survey questionnaire regarding their experience of dysmenorrhea prior to and during the menstrual period. A majority of the participants reported feeling mild to perceptible pain prior to and during the menstrual period accompanied mostly by mood(heart)-related symptoms, tendon-related symptoms, and emotion(bile)-related symptoms. Among these, only manifestations of tendon- and emotion(bile)-related

symptoms were significantly more severe during the menstrual period than prior to it. To alleviate pain, most of the participants practiced acupressure, massaged painful spots with a hot compress, and had a rest, whilst refraining from taking analgesics. Based on the findings, practical guidelines for pain management and self-care can be accordingly devised to enhance the physical, mental, and emotional well-being of females during their menstruation.

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