

# The Effectiveness of Combination Effleurage Massage and Slow Deep Breathing Technique to Decrease Menstrual Pain in University Students

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## ABSTRACT

*Introduction: Generally, menstruation happens to follow a regular pattern and it doesn't have a problem; however, some women have severe menstrual pain. In the present study, the possible useful effects of a combination of Effleurage Massage and Slow Deep Breathing technique on primary menstrual pain were investigated.*

*Methods: Thirty midwifery students with primary menstrual pain included in the study. The study was designed to measure the changes in menstrual pain score before and after combination Effleurage massage and Slow Deep Breathing technique. The therapy was applied only to the intervention group. A warm compress was applied to the control group. The Numeric Rating Scale was used to get pain scores. Pain scores were obtained one hour before and after therapy.*

*Results: The decrease of pain scores or the difference between pretest and post-test were significant in the total sample as well as in intervention and control groups. There was no significant difference between intervention and control groups in terms of pretest menstrual pain scores. But the post-test menstrual pain score was significantly lower in the intervention group than in the control group. Also, the difference (pretest minus post-test) or decrease in menstrual pain between pretest and post-test was significantly higher in the intervention group than in the control group.*

*Discussion: This result showed that the combination technique of effleurage massage and slow deep breathing is more effective than warm compress in reducing the scale of menstrual pain.*

*Conclusion: Menstrual pain can be treated non-pharmacologically. The menstrual pain can be overcome by the method of combination technique by effleurage massage and slow deep breathing. The advantages of this method are safe, easy, free of charge, free of side effects and it can be done alone. The combination techniques of effleurage massage and slow deep breathing are more effective to decrease menstrual pain compared to warm compresses.*

**Key words:** Effleurage massage, Menstrual pain, Slow deep breathing

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## INTRODUCTION

Menstruation is caused by the reduction of estrogen and progesterone at the end of the monthly ovarian cycle. During the 24 hours preceding the onset of menstruation, the tortuous blood vessels leading to the mucosal layers of the endometrium become vasospastic. The vasospasm, the decrease in nutrients to the endometrium, and the loss of hormonal stimulation initiate necrosis in the endometrium, especially of the blood vessels. As a result, blood at first seeps into the vascular layer of the endometrium and the haemorrhagic areas grow rapidly

over 24 to 36 hours. The necrotic outer layers of the endometrium separate from the uterus at the sites of the haemorrhages and all the superficial layers of the endometrium are desquamated. The mass of desquamated tissue and blood in the uterine cavity and contractile effects of prostaglandins initiate uterine contractions that expel the uterine contents [1].

Menstruation usually does not result in a problem, but some women have severe menstrual pain. The most common abnormalities are menstrual pain and premenstrual syndrome. About a third of women feel the disturbances accompanied by menstruation [2,3]. The effects of menstrual pain on teenagers include discomfort problems, decreased performance, insomnia, losing appetite, problems in interpersonal relationships, the difficulty concentrating on work and learning.

Primary dysmenorrhoea is defined as cramping pain in the lower abdomen that occurs just before or during menstruation without identifiable pelvic pathology [4]. Its symptoms are nausea, vomiting, fatigue, back pain, headache, dizziness, and diarrhoea [5]. Primary dysmenorrhoea has been reported as the leading cause of recurrent absenteeism from school or work in adolescent girls and young women and is a common disorder among women of reproductive age [6]. A survey of 1266 female university students found the total prevalence of primary dysmenorrhoea to be 88%, with 45% of females having painful menstruation in each menstrual period and 43% of females having some painful menstrual periods [7].

Excessive production and release of prostaglandins during menstruation by the endometrium causes hypercontractility of the uterus, leading to uterine hypoxia and ischemia, which are believed to cause the pain and cramps in primary dysmenorrhea [6]. Based on this understanding, pharmacological therapies for primary dysmenorrhea focus on alleviating menstrual pain and relaxing the uterine muscles by using non-steroidal anti-inflammatory drugs (NSAIDs) or oral contraceptive pills [8]. A survey of 560 female students from three medical colleges in India reported that 87% of those with dysmenorrhea also sought treatment [9]. Among the women who sought treatment, 73% took analgesics and 58% had physiotherapy management, primarily heat treatment. Managing dysmenorrhea with NSAIDs and oral contraceptives is reported to be associated with side effects such as nausea, breast tenderness, intermenstrual bleeding, and hearing and visual disturbances [10] and in about 20 to 25% of women, menstrual pain is inadequately controlled by NSAIDs alone [11]. Therefore, finding an effective non-pharmacological method for relieving symptoms of primary dysmenorrhoea has a significant potential value.

Non-pharmacological, non-invasive, and minimally invasive interventions that have been proposed for obtaining relief from dysmenorrhea symptoms include acupuncture and acupressure, biofeedback, heat treatments, transcutaneous electrical nerve stimulation (TENS), and relaxation techniques [10]. Also, some different complementary approaches were reported to be very useful to decrease pain in some other pain syndromes, for example, foot bathing therapy for surgical pain in women with caesarean section [12], moving dry cupping for upper shoulder and neck pain [13], wet cupping for shoulder pain and neck pain [14] and foot reflexotherapy for acute low back pain [15].

The prevalence of menstrual pain in adolescents in Malaysia is about 62.3% and in Indonesia, it is about 54.89%. Of women with menstrual pain (54.89%), 24.5% have medium menstrual pain, 21.28% have moderate menstrual pain and last 9.36% have severe menstrual pain [16].

The effects of menstrual pain towards young women include discomfort, decreased activity, sleeping disorder, appetite disorder, interpersonal relationships disorder, concentrating disorder on work and learning. Pain also

affects the emotional condition of feelings, irritability, depression, and anxiety [17].

In general, the handling of menstrual pain is divided into two categories, namely pharmacologic and non-pharmacologic. Pharmacologically menstrual pain can be treated with analgesic drugs such as ibuprofen and naproxen sodium. Although analgesics can reduce pain effectively, the use of medicine can lead to harmful and side effects. In addition to using pharmacological therapy, menstrual pain management can also be treated by non-pharmacological therapy [17]. Non-pharmacologic pain management is safer to use because it has no side effects. After all, it uses physiological processes. Pain management includes mild exercise or dysmenorrhea exercises, consuming fruits and vegetables, reducing levels of sugar and caffeine and massage with effleurage techniques. Other non-pharmacological therapies are warm compresses, relaxation techniques such as deep breath and yoga [18-20].

Effleurage is also one non-pharmacological therapy method considered effective in reducing pain [21]. Effleurage is a calm, rhythmic massaging technique, pressurized gently distally or downward. Effleurage aims to improve blood circulation, put pressure on, and warm the abdominal muscles and increase physical and mental relaxation. Effleurage is a massage technique that is safe, easy, does not need a lot of tools, does not need money, has no side effects and can be done alone or with the help of others. The main goal in this massage is relaxation [21].

In a recent previous study, it has been reported that combination of slow deep breathing and effleurage techniques were effective to reduce pain intensity in students with dysmenorrhea [22]. In the present study, the possible useful effects of a combination of Effleurage Massage and Slow Deep Breathing technique in comparison with a standard well-known application, the warm compresses, on primary menstrual pain were replicated and re-investigated by changing the order of these two applications.

## MATERIAL AND METHODS

### Participants

A total of 30 female university students with dysmenorrhea participated in the study (intervention group: N=15, mean age=18.927, SD=2.384; control group: N=15, mean age=19.127, SD=1.934). All subjects completed the study voluntarily. The present study was designed to measure the changes in menstrual pain score before and after combination Effleurage massage and Slow Deep Breathing technique as a complementary treatment. We recruited participants with only primary menstrual pain by asking face to face to all midwifery students of STIKes Dharma Husada. The age of the participants was not different statistically by group.

Subjects included in this study were female students who experienced menstrual pain and fulfilled the inclusion requirements. The sampling method is

purposive sampling, which is based on a certain consideration in accordance with the inclusion criteria and meets the minimum criteria of respondents.

#### **Inclusion criteria**

Students with primary menstrual pain.

Students with normal gynaecology.

Students with severe menstrual pain.

#### **Exclusion criteria**

Students who use analgesic drugs for 3 months/3 menstrual cycles.

Students with gynaecologic disorders.

Students with menstrual pain secondary to diagnosed organic or inflammatory causes.

The experimental protocol was per under international ethical standards. The study was carried out by following the Helsinki Declaration (1975, revised in 1996-2013) and approved by the local ethics committee (STIKes Dharma Husada Bandung/ethical clearance with no 006/STIKES-DHB/SKET/PSKBS2/ X/2017). The aims and objectives of the study were explicitly explained to the participants before the commencement of the study. All participants voluntarily gave written informed consent to participate in the study. Subjects with traumatic, inflammatory or other abdominal pain were excluded.

A quasi-experiment design with a pre and post-test control group design approach was used. The volunteer participants were divided into two groups randomly: intervention (treatment) and control groups. A pre-test was carried out in the intervention and control groups by showing the scale of menstrual pain. A combination of massage techniques effleurage and slow deep breathing was applied only to the intervention group. Also, the warm compress was applied to the control group. Then, a post-test was applied to both groups.

#### **Data collection for pre and post-test**

The questionnaire consisted of 2 parts.

Part 1. Demographic information: Demographic information like age, menstrual pain status.

Part 2. The subjective data were collected by using a questionnaire, The Numeric Rating Scale (NRS) [23]. NRS is a simple method used for the assessment of variations in the subjective intensity of pain. In clinical practice, as a measure of the efficacy of the treatment, NRS segmented numeric version is often used in which patients select from 0 to 10 which reflects the intensity of their pain [24]. In the NRS, zero represents "no pain" and 10 represents "extreme pain". Participants stated their pain level on the scale. This ensured that statistical evaluation of the effects of the combination of massage techniques effleurage and slow deep breathing was not influenced

by alterations in medications or physiotherapy during the study.

#### **Treatment (A combination of effleurage massage and slow deep breathing technique)**

The effleurage massage technique is to position both palms that have been given lotion or baby oil on the abdomen just above the symphysis pubic and then do a light, firm and constant stroke with a circular abdominal movement pattern, point to the side of the abdomen, continue to the umbilicus and back to the abdomen the lower part above the symphysis pubic. The shape of the movement pattern is like a butterfly. Repeat the movement for 3-5 minutes and add lotion or baby oil if needed [25]. Steps in a slow deep breathing exercise, according to the University of Pittsburgh Medical Centre [26].

Arrange the patient in a sitting position

The patient's hands are placed on the stomach

Encourage slow and deep breathing through the nose and inhale for 3 seconds, feel the abdomen expand when inhaling

Hold your breath for 3 seconds

Lip wrinkles remove through the mouth and exhale slowly for 6 seconds. Feel the abdomen move down.

Repeat steps 1 to 5 for 15 minutes.

Slow deep breathing exercises are done with a frequency of 3 times a day.

The total duration of therapy (A combination of Effleurage massage and Slow Deep Breathing technique) was approximately 20 minutes.

#### **Statistical analysis**

The data were analysed using the Statistical Package for Social Sciences 16.0 (SPSS). Paired and unpaired samples T-tests were used for analysis.

### **RESULTS**

This research was conducted on 30 respondents who experienced primary menstrual pain. They were aged 17-21 years (mean age  $18.13 \pm 1.12$  years). The decrease of pain scores or the difference between pre-test and post-test were statistically significant in total sample ( $t=10.933$ ,  $p=0.00$ ), in intervention group ( $t=9.054$ ,  $p=0.00$ ) and in control group ( $t=10.717$ ,  $p=0.00$ ) (see Table 1).

There was no statistically significant difference between intervention and control groups in terms of pre-test menstrual pain scores. But the post-test menstrual pain score was statistically significantly lower in the intervention group than in the control group ( $t=3.118$ ,  $p=0.004$ ) (Table 2). Also, the difference (pre-test minus post-test) or decrease in menstrual pain between pre-

test and post-test was statistically significantly higher in the intervention group than in the control group ( $t=3.454$ ,  $p=0.002$ ) (Table 2).

**Table 1: The mean menstrual pain scores ( $\pm$  SD) before and after effleurage massage and slow deep breathing.**

	Before (Pre-test)	After (Post-test)	t	p
Total Sample (N=30)	5.633 $\pm$ 1.066	3.9 $\pm$ 1.269	10.93	0
Intervention Group (N=15)	5.467 $\pm$ 0.915	3.267 $\pm$ 1.033	9.054	0
Control Group (N=15)	5.8 $\pm$ 1.207	4.533 $\pm$ 1.187	10.72	0

**Table 2: The differences between intervention and control groups in terms of mean menstrual pain scores ( $\pm$  SD) before and after effleurage massage and slow deep breathing.**

	Intervention group	Control group	t	p
Before (pre-test)	5.467 $\pm$ 0.915	5.8 $\pm$ 1.207	0.852	0.401
After (post-test)	3.267 $\pm$ 1.033	4.533 $\pm$ 1.187	3.118	0.004
Difference (decrease)	2.2 $\pm$ 0.941	1.267 $\pm$ 0.458	3.454	0.002

## DISCUSSION

A systematic review or meta-analysis suggested that heat, transcutaneous electrical nerve stimulation and yoga can significantly reduce the pain of dysmenorrhoea, their costs and risks are low, and they could be considered for clinical use. The review also identified moderate-grade evidence to support the use of acupuncture and acupressure, although this may be due to a placebo effect. Data from further research on these and other interventions, such as whole-body exercise, could help to provide more precise estimates of the average effects of physiotherapy interventions for dysmenorrhoea [27].

In the present study, the decrease of pain scores or the difference between pre-test and post-test were statistically significant in both intervention and control groups. There was no difference between intervention and control groups in terms of pre-test menstrual pain scores. But the post-test menstrual pain score was lower in the intervention group than in the control group. Also, the difference (pre-test minus post-test) was higher in the intervention group than in the control group. Based on these results, it can be suggested that the combinations of effleurage massage and slow deep breathing is effective to decrease the menstrual pain. This shows that the combination of effleurage massage and slow deep breathing is more effective than warm compresses in reducing menstrual pain in adolescents.

These results support the study performed by Astria *et al.* (2016) in which the combination of slow deep breathing and effective effleurage technique was very effective to decrease the intensity of dysmenorrhoea pain [22]. The present study was different from their study in order of intervention. They used slow deep breathing first, then effleurage massage technique. The present study used the effleurage massage technique first because effleurage massage aims to warm the abdominal muscles, improve blood circulation, and provide a

relaxing effect, then proceed with slow deep breathing to further relax, so pain perception changes. It can be stated that the effleurage technique can stimulate the tactile fibres so that pain signals can be inhibited. Tactile stimulation produces messages that are contrarily sent through larger nerve fibres (A Delta fibre), which will close the gate so that the cortex does not receive pain messages because it has been blocked by stimulation counters so the perception of pain changes and prevents further pain transmission to the centre of pain [18, 28].

The combination of effleurage massage and slow deep breathing techniques reduces the intensity of menstrual pain by stimulating mechanoreceptors on the skin of the abdomen, providing a relaxing and distracting effect. Mechanoreceptor stimulation of the skin can effectively reduce pain and have a relaxing effect. Stimulus performed on the skin of the abdomen provides a relaxing and distracting effect that can reduce abdominal cramping pain due to menstrual pain. Relaxation effects also give individuals self-control when there is discomfort or pain, physical stress, emotions and stimulates the release of endorphins. The release of endorphins can provide a relaxing effect and increase the parasympathetic nerve response which results in vasodilation of blood vessels throughout the body and uterus and increases uterine blood flow thereby reducing the intensity of menstrual pain. The stimulus conducted on the abdominal skin provides a relaxing effect, affecting the hypothalamus and the pain gate that stimulates the anterior hypothalamus which stimulates the release of endorphins, and affects the central nervous system by stimulating the parasympathetic nerves, resulting in vasodilation of blood vessels throughout the body and uterus [22, 29, 30].

Based on the previous research, an effleurage massage technique has a big effect on reducing the scale of menstrual pain. Slow deep breathing technique is also one of the non-pharmacological therapies that can overcome the pain of menstruation. Both techniques can

cause increases in hormone endorphins and parasympathetic nerves, so it can occur relaxations in the body and can reduce the scale of menstrual pain [22].

This combination of techniques is very useful to reduce pain during menstruation so that daily activities will not be disturbed. In this research, the effleurage massage was first performed because the effleurage massage can stimulate tactile, give warmth to the abdominal muscles, thus facilitating blood circulation and relaxation effects. After feeling relax, the student will feel more relax after performing slow deep breathing (deep breath and slow relaxation technique).

There are some advantages of these applications. The combination of effleurage massage and slow deep breathing techniques is more effective against decreasing the menstrual pain scale compared with warm compresses. Daily activities are not interrupted. The effleurage massage stimulates tactile, warms the abdominal muscles, thereby facilitating blood circulation and a relaxing effect. After feeling relaxation, the female student felt more relaxed after the female student did slow deep breathing (deep and slow breathing relaxation technique).

A lot of university students of adolescent period experience dysmenorrhea. Although some drugs are available to treat the pain, they produce side effects or incomplete pain relief in an important proportion of women with dysmenorrhea. Several physiotherapy interventions have been investigated as non-pharmacological interventions for dysmenorrhea such as the combination of slow deep breathing and effective effleurage technique.

#### LIMITATIONS

The study only uses one measuring tool to assess pain, using the Numeric Rating Scale. The time in this study is limited, so researchers do not conduct research with multiple menstrual cycles. Another limitation of research is the sampling technique by purposive sampling.

#### CONCLUSION

Menstrual pain can be treated pharmacologically and non-pharmacologically. The menstrual pain or dysmenorrhea can be overcome by the method of combination technique by effleurage massage and slow deep breathing and warm compresses. The advantages of this method are safe, easy, free of charge, free of side effects and it can be done alone. The combination techniques of effleurage massage and slow deep breathing are more effective in decreasing the scale of menstrual pain if compared with warm compresses.

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