

## Is Effleurage Massage Effective to Reduce Menstrual Pain in Female Students?

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### ABSTRACT

**Background:** Menstrual pain, or dysmenorrhoea, is common in young women worldwide under 25 years old. Elevated levels of prostaglandins in menstrual fluid induce contractions in the myometrium, leading to a decrease in uterine blood flow and resulting in uterine hypoxia. This hypoxia is the underlying cause of the painful cramping observed in primary dysmenorrhea. Massage is a non-pharmaceutical therapy that is hypothesized to be easily adoptable, with no side effects, and to have beneficial effects on pain. This study aimed to evaluate the effectiveness of effleurage massage in reducing menstrual pain in female students.

**Subjects and Method:** A randomized controlled trial was conducted at Junior High School 23 of Surakarta in July 2023. Total sample of 50 2<sup>nd</sup> grade female student was selected by purposive sampling and divided into two groups. Intervention group received effleurage massage and control group received usual care. The dependent variable was menstrual pain. The independent variable was effleurage massage. Menstrual pain was measured using Numeric Rating Scale (NRS). Pain difference between groups after intervention was examined using independent t test.

**Results:** At the 6<sup>th</sup> follow-up period, the mean of menstrual pain score in the effleurage massage group (Mean 3.52; SD= 1.01) was significantly lower compared to the control group (Mean= 4.40; SD= 0.76), with a p-value of 0.001.

**Conclusion:** Effleurage massage is effective to reduce menstrual pain in Junior High School female students.

**Keywords:** effleurage massage, primary dysmenorrhea, menstrual pain, female adolescents

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### BACKGROUND

Dysmenorrhea refers to the occurrence of pain during the menstrual cycle, typically localized in the lower abdomen and potentially extending to the inner thighs and back. This prevalent gynecologic issue can significantly affect a patient's quality of life

(Nagy et al., 2023). Primary dysmenorrhea (PD) is characterized by painful and spasmodic cramps in the lower abdomen, typically beginning shortly before or at the onset of menstruation, without any underlying pelvic pathology (Sharghi et al., 2019). It is a prevalent issue affecting both young and

adult females, with onset commonly during adolescence, occurring within 6 to 24 months after menarche. The pain associated with dysmenorrhea follows a clear and cyclic pattern, reaching its peak severity during the first day of menstruation and lasting up to 72 hours (Itani et al., 2021).

The adverse effects of primary dysmenorrhea include limitations in daily activities, school or work absenteeism, social withdrawal, decreased academic performance, and an increase in healthcare-related expenses (Akiyama et al., 2017; Abdel-Salam et al., 2018; Azagew et al., 2020). Despite its widespread occurrence and its impact on daily activities, PD often receives inadequate treatment and is sometimes overlooked. Many young females may choose to endure the discomfort in silence, without seeking medical advice (Itani et al., 2021).

Dysmenorrhea is commonly addressed through various treatment modalities, including drug therapies and complementary medicine. Notably, nonsteroidal anti-inflammatory drugs (NSAIDs) and oral contraceptive pills (OCPs) are frequently prescribed, as indicated in the literature (Rigi et al., 2012). These medications alleviate pain by inhibiting the production and release of prostaglandins. It is important to note that prolonged use of NSAIDs has been linked to potential side effects, including but not limited to headache, dizziness, drowsiness, loss of appetite, nausea, vomiting, gastrointestinal bleeding, heightened risk of acute asthma, dysuria, and acne (Sharghi et al., 2019; Unnisa et al., 2022).

Earlier studies have highlighted that physiotherapeutic interventions, backed by clinical trial evidence, offer a promising alternative treatment option for individuals experiencing primary dysmenorrhea (Fernández-Martínez et al., 2019). This is especially beneficial for individuals who may not be suitable candidates for pharmacological

treatments. Importantly, physiotherapy is noted for its lack of side effects according to the studies analyzed (Kannan et al., 2014; López-Liria et al., 2021).

## SUBJECTS AND METHOD

### 1. Study Design

This was a randomized controlled trial conducted at Junior High School 23 of Surakarta, Central Java, Indonesia.

### 2. Population and Sample

The study focused on a population of female junior high school students. A purposive sampling method was employed to select a total sample of 60 2<sup>nd</sup> grade junior high school female students. The inclusion criteria encompassed female students aged 10 years and older, who did not use painkiller medications and were unmarried. Female students with secondary dysmenorrhea or diagnosed gynecological conditions such as cysts, myomas, endometriosis, uterine fibroids, or polycystic ovary syndrome (PCOs) were excluded. During the initial intervention and follow-up period, 10 female students dropped out due to their withdrawal from the study and their failure to attend therapy sessions three times in a row. 50 female students were divided into two groups randomly. Intervention group received effleurage massage. Control group received usual care. The comparison of pain between groups was analyzed based on all patients as initially allocated following randomization.

### 3. Study Variables

The dependent variable was menstrual pain or dysmenorrhea. The independent variable was effleurage massage.

### 4. Operational Definition of Variables

**Massage effleurage** is a gentle stroking along the length of a muscle. This therapy is administered over a 6-day period, with each session lasting 10-15 minutes.

**Menstrual pain**, commonly known as dysmenorrhea, refers to the experience of discomfort characterized by lower abdominal cramps that may radiate to the back or legs, accompanied by various complex symptoms.

**5. Study Instruments**

The assessment of menstrual pain utilizes the Numeric Rating Scale (NRS), ranging from 0 to 10, where a lower score indicates a lesser intensity of pain, and conversely, a higher score signifies greater pain intensity. It is widely acknowledged as a valid and well-established patient-reported outcome measure, commonly utilized for assessing pain intensity, particularly in cases of dysmenorrhea (Hawker et al., 2011). The severity of pain was self-reported by the students before and after intervention. Other data was collected using a questionnaire.

**6. Data analysis**

Data analyses were performed using STATA version 13.0. Descriptive statistics,

**Table 1. Descriptive analysis of continous data**

Variables	n	Mean	SD	Minimum	Maximum
Age (years)	50	14.72	0.70	14	16
Menstrual duration (days)	50	5.88	0.85	5	7
Menstrual pain (pre)	50	6.04	0.83	5	7
Menstrual pain (post-1)	50	6.04	0.83	5	7
Menstrual pain (post-2)	50	5.9	0.86	4	7
Menstrual pain (post-3)	50	5.24	0.89	4	7
Menstrual pain (post-4)	50	5.24	0.89	4	7
Menstrual pain (post-5)	50	4.36	0.90	3	6
Menstrual pain (post-6)	50	3.96	0.99	2	6

**2. Bivariate Analysis**

At baseline, participants in both the effleurage massage group (Mean= 6.00; SD= 0.87) and the control group (Mean= 6.08; SD= 0.81) reported no significant difference in menstrual pain scores (p=

including mean and standard deviation, were used to characterize the data. The mean differences between groups were assessed using an independent t-test. A significance level of  $p < 0.050$  was considered for all analyses.

**7. Ethical Consideration**

This study has received ethical approval from the Research Ethics Committee of the Educational Institution at TK.II Hospital 04.05.01 Dr. Sodjono, Magelang, Indonesia, under the reference No. 107/EC/V/2023. All research participants have given informed consent and have provided written acknowledgment of their consent.

**RESULTS**

**1. Univariate Analysis**

Sample characteristics are shown in Table 1. The mean of age was 14.72 years (SD= 0.70), menstrual duration was 5.88 days (SD= 0.85), and menstrual pain at baseline was 6.04 (SD= 0.83), respectively.

0.738). There were no significant differences distribution in age ( $p = 0.425$ ) and menstrual duration ( $p = 0.743$ ) between the groups. These findings indicate that randomization resulted in equal distribution across groups.

**Table 2. Sample characteristics between groups before intervention**

Variables	Intervention group			Control group			p
	n	Mean	SD	n	Mean	SD	
Age (years)	25	14.64	0.7	25	14.8	0.71	0.425
Menstrual duration (days)	25	5.84	0.81	25	5.92	0.81	0.743
Menstrual pain (pre)	25	6.00	0.87	25	6.08	0.81	0.738

Table 3 presents the results of effleurage massage on menstrual pain. There is no significant differences were found between the groups at post intervention day-1 ( $p=0.738$ ) and day-2 ( $p=0.418$ ). On the third and fourth days, there was a marginally significant difference in menstrual pain between the groups. The effleurage massage group exhibits a lower mean score for menstrual pain compared to the control group. On the fifth day of the intervention,

the mean score for menstrual pain in the intervention group (Mean=4.00; SD= 0.87) was significantly lower than that in the control group (Mean=4.72; SD= 0.79) with a p-value of 0.004. Ultimately, on the sixth day of the intervention, the mean menstrual pain score in the intervention group (Mean= 3.52; SD= 1.01) demonstrated a significant reduction compared to the control group (Mean=4.40; SD= 0.76), with a  $p=0.001$ .

**Table 3. Mean difference of menstrual pain after intervention at each stage of follow-up**

Menstrual pain (score)	Intervention group			Control group			p
	n	Mean	SD	n	Mean	SD	
Post day-1	25	6.00	0.87	25	6.08	0.81	0.738
Post day-2	25	6.00	0.87	25	5.80	0.87	0.418
Post day-3	25	5.00	0.87	25	5.48	0.87	0.057
Post day-4	25	5.00	0.17	25	5.48	0.17	0.057
Post day-5	25	4.00	0.87	25	4.72	0.79	0.004
Post day-6	25	3.52	1.01	25	4.40	0.76	0.001

## DISCUSSION

The present study revealed that the mean score for menstrual pain in the effleurage massage group is effective in reducing menstrual pain. Effleurage massage is among the non-pharmacological physiotherapy alternatives, alongside other options including therapeutic exercise, electrotherapy, and complementary therapy, such as acupuncture, chiropractic, osteopathy, and spinal manipulation (Kiran et al., 2013).

Other studies have demonstrated the effectiveness of massage in reducing pain associated with primary dysmenorrhea. In a study by Kim et al. (2005), women with dysmenorrhea experienced a reduction in pain after receiving abdominal meridian

massage for 5 minutes daily over 6 days, starting from the fifth day before menstruation until the first day of menstruation. The control group did not receive any treatment.

Massaged muscles exhibited little cellular infiltration and regular intracellular spacing (Waters-Banker et al., 2014). A randomized controlled trial conducted by Azima et al. (2015) compared the effectiveness of lavender oil effleurage massage to isometric exercises and usual care (control group). Both interventions resulted in a notable reduction in pain intensity for individuals with primary dysmenorrhea.

The effleurage massage technique stimulates the release of endorphins, natural pain-relieving compounds in the body,

thereby alleviating discomfort in the targeted area (Gensic et al., 2017).

It is theorized that massage therapy functions by attenuating the generation of inflammatory signaling at the cellular level, concurrently facilitating the removal of inflammatory signaling factors like cytokines from the systemic circulation (White et al., 2020).

Sejari et al. (2016) indicated that massage, as a form of physical therapy, has demonstrated potential in alleviating discomfort by eliciting a multifaceted sensory response and influencing chemical mediators, including substance P and various inflammatory factors.

Crane et al. (2012) applied diverse massage techniques, including effleurage, petrissage, and slow stripping, within an interval training protocol for sedentary participants. Their findings revealed diminished activation of proinflammatory pathways, such as NF $\kappa$ B, and heightened activation of anti-inflammatory and regenerative pathways, such as ERK1/2 and FAK, 2.5 hours post-massage therapy.

In conclusion, this study suggests effleurage massage reduce menstrual pain intensity after fifth treatment compared to usual care.

#### **AUTHOR CONTRIBUTION**

Wanda Indriya Pramesti formulated the research problems and objectives, collected and analyzed the data. Wahyu Tri Sudaryanto drafted the manuscript for publication.

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None.

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#### **CONFLICT OF INTEREST**

The authors declare that there is no conflict of interest regarding the publication of this paper.

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