

The Effectiveness of Effleurage Massage in Reducing Labor Pain During the Active Phase of the First Stage of Labor at the Lolak Community Health Center

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Abstract. Labor pain during the active phase of the first stage of labor is one of the main complaints experienced by laboring mothers and can affect their comfort, physiological responses, and the smooth progress of labor if not optimally managed. One nonpharmacological method that can be used to reduce pain is effleurage massage, a gentle massage technique that provides a relaxing effect and increases the release of endorphins. This study aimed to analyze the effectiveness of effleurage massage in reducing labor pain during the active phase of the first stage of labor at the Lolak Community Health Center. The study employed a pre-experimental design with a one-group pretest-posttest design. The sample consisted of 30 women in the active phase of the first stage of labor, selected using total sampling. Pain intensity was measured using the Numeric Rating Scale (NRS) before and after the intervention, then analyzed using the Wilcoxon Signed-Rank test with a 95% confidence level. The results showed that before the intervention, most respondents experienced moderate pain (63.3%) and severe pain (36.7%). After receiving effleurage massage, the majority of respondents experienced mild pain (56.7%), and no cases of severe pain were found. The results of the Wilcoxon test indicated a significant effect of effleurage massage on reducing labor pain intensity ($p=0.000$). Effleurage massage can be an effective, safe, and easy-to-administer nonpharmacological intervention and is recommended as part of midwifery care to improve maternal comfort during labor.

Keywords: Effleurage Massage; Labor Pain; Midwifery Care; Nonpharmacological Intervention; Pain Intensity.

1. Introduction

Labor is a physiological process characterized by regular uterine contractions, cervical dilation, descent of the fetus, and expulsion of the product of conception through the birth canal. Although it is a natural process, labor is associated with a complex pain experience because it involves physiological, psychological, emotional, and social components. Labor pain primarily occurs during the active phase of the first stage of labor due to cervical dilation, cervical effacement, stretching of the lower uterine segment, and ischemia of the uterine muscles during contractions. The intensity of pain experienced by each mother varies and is influenced by factors such as parity, anxiety, age, family support, culture, and individual pain thresholds (International Association for the Study of Pain [IASP], 2020; World Health Organization [WHO], 2023).

Labor pain is one of the most common complaints among women in labor. Various studies report that approximately 90–95% of women experience moderate to severe pain during the first stage of labor, particularly during the active phase when cervical dilation reaches ≥ 4 cm (Whitburn et al., 2019). The WHO emphasizes that poorly managed pain can diminish the quality of the childbirth experience, increase anxiety, and raise the likelihood of unnecessary obstetric interventions (WHO, 2023). Therefore, pain management is a critical component of woman-centered care.

In Indonesia, labor pain remains a challenge in midwifery care. Various national studies indicate that the majority of laboring mothers experience moderate to severe pain during the active phase of the first stage of labor. This condition often causes mothers to feel afraid, panicked, unable to control their contractions, and even to opt for operative delivery out of concern that they cannot cope with labor pain. Furthermore, high levels of anxiety and unmanaged pain can reduce mothers' satisfaction with childbirth care (Indonesian Ministry of Health, 2024).

Received: November 26, 2025

Revised: Desember 28, 2025

Accepted: February 28, 2026

Availbale: April 30, 2026

Curr. Ver.: April 30, 2026



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Physiologically, labor pain triggers activation of the sympathetic nervous system, leading to increased secretion of catecholamines (epinephrine and norepinephrine), cortisol, and other stress hormones. This hormonal surge results in uteroplacental vasoconstriction, reduced blood perfusion to the uterus, decreased contraction effectiveness, increased maternal oxygen consumption, and a prolonged labor process. In addition, mothers experiencing severe pain tend to hyperventilate, become fatigued, experience breathing pattern disturbances, and have difficulty following healthcare providers' instructions, thereby potentially increasing the risk of prolonged labor, operative interventions, postpartum hemorrhage, and fetal distress (Lowe, 2017; Smith et al., 2020).

Labor pain management can be approached through both pharmacological and non-pharmacological methods. Pharmacological interventions such as epidural analgesia are indeed effective at reducing pain, but they have limitations in terms of cost, the need for trained personnel, and the potential for side effects in both the mother and the baby. Therefore, the WHO recommends the use of non-pharmacological methods as the first choice to help mothers manage labor pain safely, affordably, and easily, in line with the concept of respectful maternity care (WHO, 2023).

One widely used nonpharmacological method is effleurage massage. Effleurage massage is a gentle massage technique involving slow, circular or stroking movements on the abdomen or lower back during contractions. This technique is based on the Gate Control Theory of Pain, which involves stimulating large-diameter nerve fibers (A-beta) that inhibit the transmission of pain impulses in the spinal cord, thereby reducing the perception of pain. In addition, effleurage massage increases the release of endorphins, improves blood circulation, reduces muscle tension, and provides a relaxing effect that helps mothers better manage contractions during labor (Melzack & Wall, 1965; Field, 2019).

Various studies have demonstrated the effectiveness of effleurage massage in reducing labor pain. A systematic review by Smith et al. (2020) reported that various massage techniques during labor significantly reduced pain intensity, improved maternal comfort, and reduced the need for pharmacological analgesia. Field's (2019) study also showed that massage during labor can lower cortisol levels, increase serotonin and dopamine levels, and improve the labor experience. In Indonesia, several studies published in accredited national journals have reported that effleurage massage is effective in reducing pain scores during the active phase of the first stage of labor, accelerating maternal relaxation, and increasing satisfaction with the labor process.

The Lolak Community Health Center (Puskesmas), as one of the primary health care facilities providing normal childbirth services, has implemented various measures to enhance the comfort of laboring mothers. However, the use of non-pharmacological methods—particularly effleurage massage—has not yet been optimally implemented and has not been scientifically evaluated. In fact, this intervention is relatively easy for midwives to perform, requires no special equipment, and carries minimal risk. Therefore, research is needed to evaluate the effectiveness of effleurage massage in reducing labor pain during the active phase of the first stage of labor at the Lolak Community Health Center.

Based on the above, this study aims to analyze the effectiveness of effleurage massage in reducing labor pain during the active phase of the first stage of labor at the Lolak Community Health Center. The study results are expected to serve as a scientific basis for the development of evidence-based midwifery care, increase the use of non-pharmacological methods in labor pain management, improve the quality of mothers' childbirth experiences, and support safe, comfortable, and mother-centered childbirth services.

2. Literature Review

Labor pain is a physiological experience experienced by nearly all laboring mothers, particularly during the active phase of the first stage of labor due to uterine contractions, cervical dilation, and fetal descent. Pain intensity is influenced by various factors, such as parity, age, psychological state, family support, and individual pain thresholds. Unmanaged pain can increase anxiety, trigger the release of stress hormones, disrupt uterine contractions, and prolong the labor process; therefore, effective and safe management is essential (Smith et al., 2020; WHO, 2023).

One of the recommended nonpharmacological methods for labor pain management is effleurage massage. This technique involves gentle, rhythmic stroking motions on the mother's abdomen or back during contractions. According to the Gate Control Theory of Pain, tactile stimulation via large-diameter nerve fibers can inhibit the transmission of pain impulses to the central nervous system. In addition, effleurage massage stimulates the release of endorphins, promotes relaxation, improves blood circulation, and reduces muscle tension, thereby enabling the mother to better manage pain during labor (Field, 2019; Smith et al., 2020). Various studies have shown that effleurage massage is effective in reducing the

intensity of labor pain during the active phase of the first stage of labor. A systematic review by Smith et al. (2020) reported that massage therapy during labor can reduce pain, improve maternal comfort, and decrease the need for pharmacological analgesics. A study by Field (2019) also showed that massage can lower cortisol levels and increase endorphins, which act as the body's natural painkillers. In Indonesia, several studies published in accredited national journals have reported that effleurage massage is effective in reducing labor pain scores and enhancing a more comfortable labor experience. Therefore, effleurage massage has the potential to serve as an evidence-based complementary intervention in midwifery care to help reduce pain during the active phase of the first stage of labor.

3. Research Method

This study used a pre-experimental design with a one-group pretest–posttest design to analyze the effectiveness of effleurage massage in reducing labor pain intensity during the active phase of the first stage of labor at the Lolak Community Health Center. The study was conducted in 2026 on 30 women in the active phase of the first stage of labor who met the inclusion criteria. Total sampling was used, meaning all respondents who met the criteria were included in the study sample.

The independent variable was the effleurage massage intervention, while the dependent variable was labor pain intensity, which was measured before and after the intervention using a 0–10 Numeric Rating Scale (NRS) and categorized as no pain, mild pain, moderate pain, and severe pain. Respondent characteristics included age, education, occupation, gestational age, parity, delivery history, cervical dilation upon admission and at the time of the intervention, frequency and duration of contractions, and amniotic fluid status. The effleurage massage intervention was administered in accordance with Standard Operating Procedures (SOPs) during the active phase of the first stage of labor by trained healthcare personnel.

Data analysis was performed using univariate methods to describe the respondents' characteristics and the distribution of pain levels before and after the intervention. Normality was tested using the Shapiro–Wilk test. The effectiveness of effleurage massage was analyzed using the Wilcoxon signed-rank test because the data consisted of paired pain scores on an ordinal scale. If the data were normally distributed, the Wilcoxon test would have been used. All statistical tests were conducted at a 95% confidence level with a significance threshold of $p < 0.05$. The study was conducted in accordance with the ethical principles of health research through informed consent, confidentiality of respondent identities, and the principles of beneficence, non-maleficence, and justice.

4. Result and Discussion

Table 1. Demographic Data

		Var	n	F (%)
Ages	<20 years old		1	3.3
	20–35 years old		28	93.3
	>35 years old		1	3.3
Education	No education		0	0
	Elementary school		1	3.3
	Junior high school		5	16.7
	High school		20	66.7
	College		4	13.3
Employment	Housewife		27	90.0
	Private-sector employee		2	6.7
	Contracting officer		0	0
	Civil Servant		1	3.3
Parity	1		13	43.3
	2		16	53.3
	3		1	3.3
Trimester	1		0	0
	2		30	100.0
	3		0	0
Amniotic sac	Intact			
	Broken			
Total			30	100

(source: primary data, 2026)

Based on the demographic data presented in Table 1, this study involved 30 women in labor as respondents. The age distribution shows that the majority of respondents were in the safe and mature reproductive age group, namely 20–35 years old, totaling 28 people (93.3%), while the high-risk age groups (<20 years and >35 years) each accounted for only 3.3% (1 person). In terms of educational level, the majority of respondents had a high school (Senior

High School)—20 participants (66.7%)—followed by junior high school graduates (SMP)—5 participants (16.7%), college graduates—4 participants (13.3%), and elementary school graduates—3.3% (1 participant).

In terms of employment status, the highest percentage was accounted for by housewives, totaling 27 people (90.0%), while the remainder worked as private-sector employees (6.7%, or 2 people) and civil servants (3.3%, or 1 person). Based on parity characteristics, more than half of the respondents were multiparous mothers (second pregnancy), totaling 16 women (53.3%), followed by primiparous mothers (first pregnancy), totaling 13 women (43.3%), and only 1 woman (3.3%) with a third pregnancy.

Table 2. Research Data

Var		n	F (%)
Pain before	Mild	0	0
	Moderate	19	63.3
	Severe	11	36.7
Pain after	Mild	17	56.7
	Moderate	13	43.3
	Severe	0	0
Total		30	100

(source: primary data, 2026)

Table 2 outlines the severity of pain experienced by the respondents before (pre-test) and after (post-test) receiving the Effleurage Massage intervention. Before the intervention, none of the respondents experienced mild pain (0%). Most respondents experienced moderate pain (19 people, or 63.3%), while the remaining 11 people (36.7%) experienced severe pain.

After receiving the Effleurage massage treatment, there was a very significant shift in pain intensity toward milder levels. The number of respondents experiencing mild pain rose sharply from 0% to 17 people (56.7%). Meanwhile, the number of respondents reporting moderate pain decreased to 13 people (43.3%), and most crucially, there were no longer any respondents (0%) in the severe pain category.

Table 3. Statistical Analysis (Numerical Data)

Independent variable	N	P-Value	Dep. Var.
Pain before	30	0.000*	Pain after

Wilcoxon

*significant

(source: primary data, 2025)

A hypothesis test was conducted to determine the effectiveness of Effleurage Massage in reducing the intensity of labor pain. Given that the pain level variable is ordinal categorical data (mild, moderate, severe), paired comparative analysis was performed using the nonparametric Wilcoxon Signed-Rank Test.

Based on the analysis results in Table 3, a P-value of 0.000 ($p < 0.05$) was obtained. This highly significant statistical finding provides strong empirical evidence to reject the null hypothesis (H_0), indicating that Effleurage Massage has a highly effective and significant effect on reducing labor pain during the active phase of the first stage of labor among women giving birth at the Lolak Community Health Center.

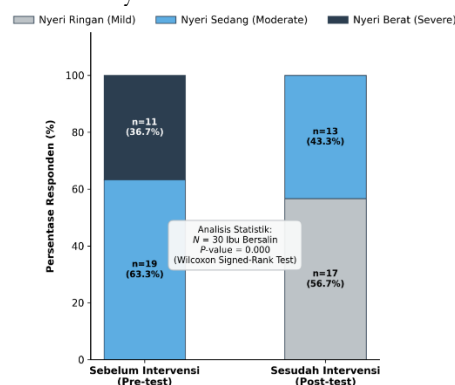


Figure 1. Distribution of labor pain levels during the active phase of the first stage of labor before and after the Effleurage Massage intervention (N = 30). Each colored segment on the bar chart represents the absolute number (n) and its percentage contribution to the total sample. Analysis using the Wilcoxon Signed-Rank Test showed a statistically highly significant decrease in labor pain intensity ($p =$

0.000), marked by a reduction in the total number of severe pain cases from 36.7% to 0% and the predominance of mild pain at 56.7% post-intervention.

Discussion

The main findings of this study clearly demonstrate that the application of Effleurage Massage has very strong clinical efficacy in reducing labor pain intensity during the active phase of the first stage of labor. The shift in the pain distribution—showing the disappearance of the severe pain category (from 36.7% to 0%) and the dominance of the mild pain category post-intervention (56.7%)—confirms that this cutaneous physical stimulation is capable of altering the sensory perception of pain in laboring women. Scientifically, this successful reduction in pain intensity can be explained by the neurological mechanisms of inhibited pain nerve conduction and the activation of the endogenous opioid system in the human body.

From a neurophysiological perspective, the effectiveness of effleurage massage is rooted in the Gate Control Theory, which has been widely adopted in the field of maternal nursing. According to Smith et al. (2023), when a gentle, rhythmic circular stroking technique (effleurage) is applied to the skin surface of a laboring mother's abdomen or back, this action stimulates local tactile mechanoreceptors connected by large myelinated nerve fibers, namely A-beta fibers. Stimulation of these A-beta fibers transmits touch signals to the spinal cord much more rapidly than pain signals carried by small-diameter unmyelinated nerve fibers (C fibers) from uterine contractions (Jones & Davis, 2024). As a result, the mechanoreceptor impulses that arrive first activate inhibitory interneurons in the substantia gelatinosa (dorsal horn) of the spinal cord, effectively “closing the gate” and blocking the transmission of pain impulses to the thalamus and cerebral cortex (White & Thompson, 2023).

In addition to blocking physical transmission pathways, the rhythmic effleurage strokes also trigger a psychological relaxation response that stimulates the secretion of calming neurotransmitters. Constant skin stroking can stimulate the release of endorphins and enkephalins, which act as the body's natural analgesics (Putri & Lestari, 2024). High levels of endorphins in the bloodstream bind to opioid receptors in the central nervous system, which directly raise the pain perception threshold and reduce maternal anxiety (Pratiwi & Wijaya, 2025). This reduction in anxiety is crucial because stress and panic during the active phase of labor can trigger a surge in the catecholamine hormone (adrenaline), which in turn causes vasoconstriction of the uterine blood vessels, myometrial ischemia, and ultimately leads to an intensification of pain (Sari & Ramadhan, 2024).

The demographic characteristics of the respondents in this study also played a significant role in the success rate of the intervention. The majority of respondents (93.3%) were within the healthy reproductive age range (20–35 years), and psychologically, they possessed more mature cognitive readiness and coping mechanisms for accepting instructions on non-pharmacological relaxation techniques (Sulistyo et al., 2025). Additionally, 53.3% of the respondents were multiparous. Multiparous women generally have a shorter active phase of the first stage of labor and better cervical flexibility compared to primiparous women; thus, with the help of Effleurage Massage, relaxation of the pelvic and perineal muscles becomes significantly more optimal (Kurniawan & Utami, 2025). For the 43.3% of primiparous respondents experiencing childbirth for the first time, this massage served as an essential form of physical and emotional support that reduced feelings of helplessness (Ahmad & Sulistyo, 2025).

The main advantages of Effleurage Massage as a non-pharmacological pain management modality are its non-invasive nature, affordability, ease of application, and the fact that it is completely free of harmful side effects for both the mother and the fetus (Widuri et al., 2024). Unlike epidural analgesia or the use of opioid medications—which carry the risk of causing respiratory depression in the newborn or prolonging the duration of the second stage of labor—effleurage actually preserves the mother's autonomy and full consciousness throughout the birthing process (Rahmawati et al., 2023).

Although this pre-experimental study lacked a true control group (Sitompul & Nugroho, 2024), the results of the Wilcoxon test, which showed absolute significance ($p=0.000$), demonstrate that Effleurage Massage has very high practical value. Therefore, the implementation of this technique is highly recommended for integration into maternal care standards at community health centers and other primary health care facilities to ensure a low-trauma, safe, and comfortable childbirth experience.

5. Conclusion

This study demonstrates that effleurage massage is effective in reducing labor pain during the active phase of the first stage of labor at the Lolak Community Health Center. Following the intervention, pain levels shifted from predominantly moderate and severe pain to mild and moderate pain, and no respondents were found to be experiencing severe pain. The results of the Wilcoxon test showed a statistically significant difference between pain

levels before and after the intervention ($p=0.000$). These findings suggest that effleurage massage can serve as a safe, easy-to-administer, and effective nonpharmacological intervention to help reduce labor pain and enhance maternal comfort during the labor process.

This study has limitations due to its pre-experimental design without a control group, a relatively small sample size, and the fact that it was conducted at only one healthcare facility; therefore, the results must be interpreted with caution and cannot yet be widely generalized. Consequently, midwives and healthcare providers are advised to integrate effleurage massage as part of compassionate maternal care in managing labor pain during the active phase of the first stage of labor. Future research is expected to use a randomized controlled trial or quasi-experimental design with a control group, involve a larger number of participants and multiple healthcare facilities, and examine the effectiveness of effleurage massage compared to other nonpharmacological methods to obtain stronger scientific evidence.

Acknowledgments

The authors would like to thank the Lolak Community Health Center for granting permission, providing support, and making facilities available during the conduct of this study. Thanks are also extended to all the laboring mothers who volunteered to participate in this study. The authors would like to thank the Midwifery Undergraduate Program at the Institute of Technology, Science, and Health, Dr. Soepraoen Hospital, Malang, for their academic support and guidance throughout the research process and manuscript preparation. This article is part of the results of an academic research project conducted to fulfill the final project requirement for students in the Bachelor's Program in Midwifery. The author also extends appreciation to all parties who provided assistance, feedback, and support, enabling this research to be successfully completed.

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