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The Effect of Endorphin Massage on Reducing Labor Pain Intensity During the Active Phase of the First Stage of Labor at Ledokombo Public Health Center, Jember Regency

Novi Yuliastuti[1], Nila Widya Keswara[2]
[1,2]Institut Teknologi, Sains, dan Kesehatan RS dr. Soepraoen Malang

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ABSTRACT
The most common complaint experienced by mothers during the first stage of labor, active phase, is pain, which can trigger excessive stress and anxiety. This condition may lead to increased respiratory rate and pulse, potentially disrupting oxygen supply from the placenta to the fetus. One simple method that can help reduce labor pain is the endorphin massage technique. The purpose of this study was to examine the difference in pain levels experienced by mothers in the first stage of labor, active phase, before and after receiving endorphin massage. This study used a pre-experimental design with a one-group pretest-posttest approach. It involved 20 laboring mothers in the active phase of the first stage who experienced discomfort ranging from severe (scale 7–9) to very severe (scale 10). Measurements taken before the endorphin massage intervention showed an average pain intensity score of 5 and a maximum of 10. After the endorphin massage was administered, the average pain intensity decreased to 4 with a maximum of 9. There was a notable difference indicating a reduction in pain levels among mothers in the active phase of the first stage of labor before and after receiving endorphin massage intervention.

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Corresponding Author:
Novi Yuliastuti
Institut Teknologi, Sains, dan Kesehatan RS dr. Soepraoen Malang
Jl. S. Supriadi No.22, Sukun, Kec. Sukun, Kota Malang, Jawa Timur Kode Pos: 65147
noviyuliastuti70@gmail.com

INTRODUCTION

Pain experienced during the childbirth process is a discomforting sensation that arises throughout labor. Pain caused by uterine contractions during labor triggers overactivation of the sympathetic autonomic nervous system, resulting in changes in blood pressure, heart rate, and breathing patterns. If this condition is not addressed promptly, it can lead to feelings of anxiety, tension, fear, and stress. Additionally, pain in laboring mothers can increase the release of stress hormones or catecholamines, such as epinephrine and cortisol. The rise in these hormones can reduce the mother's ability to cope with pain (Maryunani, 2011).

The most effective and efficient efforts to relieve labor pain can be carried out through medical interventions, including pharmacological therapy, as well as natural or non-pharmacological methods. Non-clinical approaches that can be applied by healthcare

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professionals, including midwives, include relaxation techniques, guided concentration and imagery, breathing exercises, hydrotherapy, massage or therapeutic touch, hypnosis, acupuncture and acupressure, homeopathy, audio and visual stimulation related to labor, body positioning, gym ball usage, water birth, Zilgrei movement and breathing techniques, Hypnobirthing methods, acupuncture therapy, spiritual chanting or dhikr techniques, yoga and stretching exercises, warm compresses, active birthing methods, and Reiki therapy (Meiliasari and Danuatmaja, 2021; Padila, 2021).

A study conducted by Lilis, Artikasari, and Sukmawati (2021) on the effect of warm compresses on pain intensity found that, before the intervention, 62.3% of laboring mothers experienced high-intensity pain. However, after the application of warm compresses, 60% reported a decrease to moderate pain intensity.

In a preliminary study conducted at Ledokombo Public Health Center from May to June 2025, all 20 mothers in the first stage of labor reported experiencing very severe pain. Moreover, warm compress techniques had not yet been applied as a pain relief method during labor. Based on this background, the researcher was motivated to conduct a study entitled "The Effect of Endorphin Massage on Reducing Labor Pain Intensity During the Active Phase of the First Stage of Labor at Ledokombo Public Health Center, Jember Regency."

RESEARCH METHOD

This study adopts a quantitative approach through an experimental method, specifically a pre-experimental design. In this design, there is only one group of subjects that receives the intervention, with measurements taken before and after the intervention (Sugiyono, 2017:114). The study employs a one-group pretest-posttest design. According to Sugiyono (2019:116), this design involves a single group obtained through random selection, followed by a pretest to determine the initial condition. The group is then given the treatment in the form of endorphin massage, and a posttest is conducted to observe any differences before and after the intervention.

RESULT AND DISCUSSION

Result

General Overview of the Study

This study was conducted at Ledokombo Public Health Center, located at Jl. Cumedak No. 124, Ledokombo, Jember City. The health center oversees 10 villages and provides maternal and child health services, including antenatal care (ANC), labor and delivery services, family planning programs, and immunizations. To support these services, the facility is equipped with two delivery rooms with four beds, four postpartum rooms, and one examination room. General service hours run daily from 07:00 to 21:00 WIB, while delivery services are available 24 hours a day.

This study was carried out in May 2025 using a consecutive sampling technique for respondent selection. A total of 20 respondents participated in the study. Prior to receiving the intervention in the form of endorphin massage, respondents first underwent a pretest to

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measure pain levels. The measurement was conducted by asking respondents to circle a number on a scale from 1 to 10 that best reflected their perceived pain, ranging from no pain to extreme pain that could cause loss of consciousness. This assessment was carried out using the Numeric Rating Scale (NRS) instrument sheet.

Endorphin massage therapy was then administered for 15 minutes every hour. After the intervention was given up to the point of cervical dilation reaching 7 cm, a post-test was conducted by distributing the numeric pain scale form again to respondents, allowing them to indicate a score that represented their pain level.

Univariate Analysis

Respondent Profile

Table 1. Frequency of Respondent Characteristics by Age

Age	Number	Percentage(%)
<20 years	7	25,0
20-35 years	13	75,0
>35 years	0	0
Total	20	100

From Table 1, it can be seen that the age distribution of respondents at Ledokombo Public Health Center involved 20 laboring mothers. Of this total, 7 participants (25%) were under the age of 20, 13 participants (75%) were within the age range of 20–35 years, and no participants (0%) were over the age of 35. This information indicates that the majority of deliveries occurred among pregnant women aged between 20 and 35 years.

Table 1 also shows that the age group of 20–35 years was the most represented among respondents, while the smallest number was in the category of mothers under twenty years old. Younger mothers tend to experience a higher degree of pain than older mothers. This is related to psychological conditions that are less stable at a younger age, making them more prone to anxiety and intensifying their perception of pain. Age is one of the factors that can affect pain tolerance (Adam, 2015). Anxiety during labor can increase the excessive production of catecholamines, which impacts blood flow to the uterus, reduces the strength of uterine contractions, and decreases blood and oxygen supply to the placenta and fetus. This condition may lead to a prolonged duration of the first stage of labor, active phase (Trisetiyaningsih & Wulansari, 2018).

Table 2. Frequency of Respondent Characteristics by Education

Education	Number	Percentage(%)
Primary (SD,SMP)	6	30,0
Senior High (SMA,SMK)	10	50,0
Higher Education	4	20,0
Total	20	100

Referring to the data above, the profile of participants at Ledokombo Public Health Center based on education level shows that out of a total of 20 laboring mothers, six mothers or approximately 30% had a basic education (elementary and junior high school). Ten respondents (50%) had a secondary education background, and four participants (20%) had

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a higher education background. This data indicates that the majority of labor cases occurred among mothers with a secondary level of education.

Based on Table 2, it is evident that most participants had a senior high school education, totaling 10 individuals (50%). Meanwhile, respondents with a college or university education were the fewest, with only four individuals (20%), and six participants (30%) had a basic education background (elementary–junior high school). Education level is closely related to a person's ability to understand information and influences their awareness and response to stimuli, including pain. Each individual responds differently to labor pain, depending on their coping mechanisms, which are influenced by educational background. Individuals with lower educational levels tend to apply less effective coping strategies, while those with higher education are more likely to have better adaptation strategies. A study by Siregar (2019) showed that educational background affects a mother's knowledge of the childbirth process, the discomfort experienced, and the ways in which pain is managed. Mothers with good knowledge are better able to control labor pain effectively.

The Average Initial Pain

Table 3. Initial Pain

Variable	Minumum	Maximum
Pre test	5	10
Post test	4	9

According to the data, the average initial pain scale score in the experimental test group ranged from a minimum of 5 to a maximum of 10. Meanwhile, in the post-test, the pain scale ranged from 4 to 9. The data also shows that out of 20 respondents, 7 were primiparous and 13 were multiparous mothers. According to theory, there is a difference in the level of pain experienced by primiparous and multiparous women, where multiparous mothers tend to experience less intense pain compared to primiparous mothers. This difference is caused by the different processes of cervical dilation; in women giving birth for the first time, the internal cervical os opens first, causing the cervix to gradually thin and flatten. In multiparous women, both the internal and external cervical os begin to open simultaneously, allowing the thinning and flattening process to occur at the same time. This theoretical explanation aligns with the findings of this study, in which primiparous mothers experienced very high-intensity pain, while multiparous women reported moderate pain levels. The intensity of pain in both groups decreased after the intervention in the form of massage. The findings indicate that the average pain intensity during the pre-test in the experimental group ranged between 5 and 10 on the scale, while in the post-test, it decreased to between 4 and 9.

The pain experienced during the first stage of labor is caused by several factors, such as tension in the uterine muscles, lack of oxygen in the contracting muscle systems, cervical dilation during opening, ischemia in parts of the uterus, and distension of the lower uterine segment. During this phase, uterine contractions trigger cervical opening and cause uterine ischemia. Pain stimuli are transmitted through the segments of the lower thoracic spinal cord and lumbar sympathetic nerves originating from the uterus and cervix. The discomfort resulting from cervical changes and decreased blood flow to the uterus is classified as visceral

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pain, typically occurring in the lower abdomen and radiating to the lower back and inner thighs. Generally, women feel pain only during contractions, and the sensation subsides during rest periods. This pain is localized, resembling muscle cramps, a burning sensation, or tearing pain, caused by stretching and tearing of the cervix, vagina, and perineal tissues (Febrina, 2017:52).

Bivariate Analysis

The data processing method applied in this study involved a paired sample t-test to identify the difference in pain intensity levels before and after the intervention. The use of a t-test requires that the data have a normal distribution and be homogeneous. If the normality test results show that the data do not follow a normal distribution and do not meet the assumption of normality, the analysis proceeds with the non-parametric Wilcoxon test.

Data Normality Test

The examination of normal data distribution in this study was carried out using the Shapiro-Wilk method on the experimental group, considering that the number of participants was fewer than 50. Data are considered normally distributed if the significance level (p-value) exceeds 0.05 based on the normality test results. This information is presented in the table below:

Table 3. Normality Test

No	Variable	P value	Conclusion
1	Pre test	0,061	Normally Distributed
2	Post test	0,016	Normally Distributed

According to the results of the normality test conducted using the Shapiro-Wilk method, it was found that all parameters in the experimental group showed p-values of (0.061; 0.016), which are close to the significance threshold and exceed 0.05. Therefore, the data are considered to be normally distributed. As a result, the Paired Sample T-Test was applied to evaluate the presence of an effect from the intervention.

Comparison of Pain Intensity Before and After Endorphin Massage

Tabel 5. Comparison of Pain Intensity

	Variable	N	Pvalue
Experiment	Pre Test	20	0,003
	Post Test	20	

The data above presents the output of the paired t-test analysis conducted on the experimental group. Based on the analysis, the obtained p-value was 0.003 ($P < \alpha$), indicating a significant difference between the pain intensity levels before and after the administration of endorphin massage in mothers giving birth at Ledokombo Public Health Center.

Findings from the paired t-test indicate a difference in discomfort levels before and after the endorphin massage in the experimental group, with a p-value of 0.003 ($P < \alpha$). Therefore, it can be concluded that endorphin massage has an effect on reducing pain in mothers undergoing labor at Ledokombo Health Center.

These findings support the results of research by Siahaan (2017) titled *"The Effect of Endorphin Massage Therapy on Back Pain Complaints in Primigravida Pregnant Women at*

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Citra Medan Maternity Clinic." The study involved 20 respondents and used a pre-experimental design with a pre-test post-test model and a comparison group. Data processing was carried out using independent t-test analysis. The results revealed that endorphin massage had an impact on reducing back pain levels in first-time pregnant women during the active phase of labor, with a p-value of 0.001 based on the dependent t-test (Siahaan, 2017).

The researcher assumes that the application of endorphin massage has a significant effect on reducing the severity of labor pain during the active phase of the first stage of labor. Women who received this massage tended to feel calmer, more relaxed, and more comfortable, and experienced emotional closeness with the healthcare provider administering the intervention, which in turn may indirectly help reduce their perception of pain.

CONCLUSION

Referring to the research findings and analysis regarding the effect of endorphin massage therapy on reducing labor pain intensity at Ledokombo Public Health Center in Jember, it can thus be stated that the values obtained after the post-test in the treatment group indicate that endorphin massage has an effect in reducing the degree of pain experienced by mothers in the first stage of active labor at Ledokombo Health Center in Jember. A difference was found in the pain levels before and after receiving endorphin massage in mothers during the active phase of the first stage of labor at the study site. The decrease in pain intensity was more dominant in the group of mothers who received the endorphin massage intervention compared to subjects who were not given the intervention.

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