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## Difference oxytocin massage and endorphin massage against reduction in pain scale during first stage of labor

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### Abstract

**Background:** Oxytocin massage is a massage along the spine to stimulate an increase in oxytocin, which serves to increase uterine contractions, promote relaxation, and reduce pain perception. Meanwhile, endorphin massage is performed with gentle massage on the back, shoulders, and arms to stimulate the production of endorphins as the body's natural analgesic. Both methods have been proven to help reduce pain, but their relative effectiveness varies, so further study is needed.

**Purpose:** To determine the difference in effectiveness between oxytocin massage and endorphin massage on reducing the pain scale during the first stage of labour.

**Method:** This study used a quasi-experimental design with a two-group pretest–posttest approach. A sample of 40 mothers in labour was selected using purposive sampling and divided into two groups, namely the oxytocin massage group and the endorphin massage group. Pain was measured using a Numeric Rating Scale (NRS) before and after the intervention. Data analysis was performed using the Shapiro–Wilk normality test, followed by Wilcoxon and Mann–Whitney tests for intergroup comparisons.

**Results:** The results of the study showed that there was a significant difference in pain scale before and after oxytocin massage, with a p-value of 0.000. There was a significant difference in pain scale before and after endorphin massage, with a Wilcoxon test p-value of 0.000.

**Conclusion:** There was no significant difference between oxytocin massage and endorphin massage in reducing the labour pain scale at RA Kartini Regional General Hospital in Jepara, with a Mann-Whitney p-value of 0.289.

**Suggestion:** Other researchers are advised to develop additional variables such as anxiety levels and duration of labour, and to compare other non-pharmacological interventions in order to obtain different results.

**Keywords:** Endorphin Massage; Oxytocin Massage; Pain Scale

### INTRODUCTION

Labor pain arises from uterine contractions, cervical dilation, and fetal pressure on the pelvic structures. Unmanaged pain intensity can increase stress hormones, disrupt the mother's concentration, and slow down labor progress, thereby potentially increasing the need for medical intervention. Therefore, pain management is an important aspect in supporting a smooth delivery (Rejeki, 2020).

Pain management during labor can be achieved through pharmacological or non-pharmacological methods. Although analgesics and anesthetics are

effective, non-pharmacological methods such as deep breathing techniques, warm compresses, aromatherapy, and massage are increasingly recommended because they are safe, easy to apply, and do not cause side effects for the mother or fetus (Ningdiah, Ningsih, Iskandiani, & Lawra, 2022).

Massage is one of the non-pharmacological interventions proven to be effective in reducing the intensity of labour pain. Physiologically, massage can inhibit the transmission of pain signals through the gate control mechanism, improve blood circulation,

reduce muscle tension, and stimulate the release of endorphins, which act as the body's natural analgesics (Christiani, Indrayani, & Widowati, 2022).

One of the massage techniques used is oxytocin massage, which involves gentle massage along the spine to the 5th–6th ribs to stimulate the release of the hormone oxytocin. Oxytocin functions to increase rhythmic uterine contractions and assist in the smooth delivery process (Zanah & Hanim, 2025). Explains that oxytocin massage is effective in reducing pain and accelerating cervical dilation during the active phase. Oxytocin massage with light touch or spinal massage starting from costa 5-6 to the scapula is used to reduce discomfort during the delivery process (Natalia & Asiyah, 2025).

In addition, there is endorphin massage, namely massage rhythmic in the back, shoulders and arms For increase secretion hormone endorphins. Endorphins functioning as analgesic natural that provides a sense of calm and reduces perception pain (Rohma & Rejeki, 2023). Research with quasi-experimental studies showed that endorphin massage influential significant to decline pain in the mother giving birth phase active. The comparison of pain intensity in mothers during the active phase of the first stage of labour between the experimental and control groups was analyzed using the independent sample t-test parametric test, and the p-value result was  $0.000 < 0.05$  (Sevtiani, Rahayu, & Suarnit, 2025).

Although both massage techniques have been proven effective in reducing pain, there is still limited research directly comparing the effectiveness of

oxytocin massage and endorphin massage in a clinical context. Variations in previous research results suggest that each technique has different mechanisms and strengths of effect. Therefore, comparative research is needed to determine the most optimal massage technique for reducing the scale of labour pain.

## RESEARCH METHOD

This study is a quantitative study with a quasi-experimental design using a two-group pretest-posttest design. This design involves two treatment groups, namely the Oxytocin Massage group and the Endorphin Massage group, without a control group. This study will be conducted at R.A. Kartini Jepara Regional General Hospital, specifically in the delivery room. The research is planned to be conducted in November–December 2025, after obtaining permission from the hospital and ethical approval for health research.

The population in this study consists of all mothers in active phase I labour at the R.A. Kartini Jepara Regional General Hospital who meet the inclusion criteria during the research period, totalling 45 people. The sampling technique used purposive sampling, and the sample size was calculated using the Slovin formula, resulting in 40 respondents divided into two groups. The instrument used was the Numeric Rating Scale pain measurement instrument. Data were analysed using the Wilcoxon and Mann-Whitney tests.

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## RESEARCH RESULT

**Table 1. Intensity Overview Painful Before and After Given Intervention in Groups Oxytocin and Endorphin (N= 40)**

| Variable                              | Oxytocin Group<br>(N=20) | Endorphin Group<br>(N=20) |
|---------------------------------------|--------------------------|---------------------------|
| <b>Pain Intensity Pre-test (n/%)</b>  |                          |                           |
| Mild                                  | 0/0                      | 0/0                       |
| Moderate                              | 6/30.0                   | 7/35.0                    |
| Severe                                | 14/70.0                  | 13/65.0                   |
| <b>Pain Intensity Post-test (n/%)</b> |                          |                           |
| Mild                                  | 9/45.0                   | 5/25.0                    |
| Moderate                              | 11/55.0                  | 15/75.0                   |
| Severe                                | 0/0                      | 0/0                       |

Table 1. above shows that of the 40 respondents studied before the intervention, 14 (35%) respondents experienced severe pain in the oxytocin massage group and 13 (32.5%) in the endorphin massage group. After receiving oxytocin and endorphin massages. There were 11 (27.5%) respondents who experienced moderate pain, 9 (22.5%) who experienced mild pain in the oxytocin group, and 15 (37.5%) who experienced moderate pain and 5 (12.5%) who experienced mild pain in the endorphin group.

**Table 2. scale pain (pre-post) in the group massage oxytocin and endorphin (n=40)**

| Variable                        | Mean (Min- Max) | Z      | Wilcoxon | Mann Whitney |
|---------------------------------|-----------------|--------|----------|--------------|
| <b>Group Massage oxytocin</b>   |                 |        |          |              |
| Pain scale (pre)                | 7 (6-8)         | -4.065 | 0.000    |              |
| Pain scale (post)               | 3.9 (3-6)       |        |          | 0.289        |
| <b>Group Massage endorphins</b> |                 |        |          |              |
| Pain scale (pre)                | 6.9 (5-8)       | -4.243 | 0.000    |              |
| Pain scale (post)               | 4.5 (3-6)       |        |          |              |

Table 2. above shows that in the oxytocin massage group, the average pain level before oxytocin massage was 7, with the lowest pain level being 6 and the highest being 8, then decreased to 3.9, with the lowest pain level being 3 and the highest being 6. The Wilcoxon test value of 0.000 is less than 0.05, indicating a significant difference in pain scale before and after oxytocin massage.

Additionally, in the other group, before receiving endorphin massage, the average pain scale was 6.9, with the lowest pain level being 5 and the highest being 8, then decreased to 4.5, with the lowest pain level being 3 and the highest being 6. The Wilcoxon test value of 0.000 is less than 0.05, indicating a

significant difference in pain scale before and after receiving endorphin massage.

The results of the Mann-Whitney test with SPSS showed that the p-value was 0.289, which is greater than 0.05, so it can be concluded that there was no significant difference between oxytocin massage and endorphin massage in reducing the pain scale during labour at RA Kartini Hospital in Jepara. This indicates that both oxytocin and endorphin massage equally reduce labour pain scale during the first stage of labour at RA Kartini General Hospital in Jepara, as seen from the difference in pain levels before and after each group.

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## DISCUSSION

The results of the study showed that there was a significant difference in pain levels before and after oxytocin massage, with a p-value of 0.000. The average pain level before oxytocin massage was 7, which then decreased to 3.9. Supported by research conducted labor pain before and after oxytocin massage decreased with a mean difference of 4.40, while labor pain before and after endorphin massage decreased with a mean difference of 3.06. The dependent t-test results for oxytocin massage showed a p-value of 0.00 (Kundaryanti, Rizkiyanti, & Siauta, 2023). Oxytocin massage was also effective in reducing the intensity of labor pain in the first stage, with the NRS score decreasing from 7 at the first visit to 4 at the second visit and remaining at 4 at the third visit (Nurbaeti, Dewi, & Ciptiasrini, 2024).

The oxytocin massage method during labor helps increase the release of oxytocin, a hormone that facilitates labor, controls persistent pain, manages stress, reduces or alleviates pain in the labouring mother, promotes relaxation in the body by inducing a sense of comfort through the skin surface, and reduces the risk of complications during labor and bleeding. A calm state promotes hormonal balance in the body, and this massage also significantly helps strengthen the bond between the wife and husband or the birth attendant massaging the mother (Sulistyaningsih, Mariyana, & Oktiningrum, 2023).

Mothers who were given oxytocin massage said that they felt calmer and more comfortable during labour. The massage provided benefits to mothers in labour, namely improving blood circulation and stretching the muscles, thereby reducing the pain experienced during labour (Saleha & Sulastriningsih, 2022). The administration of oxytocin massage when patients experience pain due to labour can assist midwives in providing midwifery care, as the administration of oxytocin massage to normal labouring women during the active phase of labour can minimise side effects and is cost-effective.

In this study, oxytocin massage was very beneficial for mothers in labour because it reduced pain during childbirth. When pain is managed, mothers feel relaxed and comfortable, allowing them to go through the delivery process calmly. When the mother is calm during labour, the delivery will proceed

normally. If the mother is stressed during labour, the sympathetic nervous system will function to maintain heart activity (Chakti, Indrayani, & Sariaty, 2022). Impairment of the sympathetic nerves will decrease the frequency and slightly reduce the variability of the foetal heart rate. If the mother cannot relax during the delivery process, it can cause anxiety and an endocrine response, which can lead to sodium retention, potassium excretion, and a decrease in glucose. This condition can cause the secretion of epinephrine, which can inhibit myometrial activity, thereby disrupting uterine contractions. If uterine contractions are disrupted during delivery, the delivery will not proceed as it should.

The results of the study showed that there was a significant difference in pain scale before and after endorphin massage with a Wilcoxon test p-value of 0.000. Before endorphin massage, the average pain scale was 6.9, then decreased to 4.5. Supported by other study the mean pretest value for labour pain intensity was 6.18, while the mean posttest value for labour pain intensity was 4.32. The Wilcoxon rank test yielded a p-value of 0.000 (Hajar & Hasanah, 2023). A similar result was found in the other study in the results of the paired t-test conducted in the experiment. Based on the results of the paired t-test of pain intensity before and after endorphin massage treatment in the experiment, a P-value of 0.003 ( $P < \alpha$ ) was obtained, so it can be concluded that there is a difference in pain intensity before and after endorphin massage treatment in the experiment on mothers giving birth at BPM Sagita Darma Sari Palembang (Sari & Triani, 2023).

According to Mander that the main action of massage is considered to close the gate to inhibit the transmission of pain stimuli to higher centres in the nervous system. Furthermore, tactile stimulation and positive feelings, which develop when attentive and empathetic touch is applied, act to reinforce the effects of massage in controlling pain (Tanjung & Antoni (2022)

Endorphins affect the transmission of impulses that are interpreted as pain. Endorphins can be neurotransmitters that inhibit the transmission or delivery of pain messages. The presence of endorphins in nerve cell synapses causes a decrease in pain sensation (Fauzi, Hasanah, & Rozi, 2023). Endorphin levels vary from person to person. People

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with high endorphin levels experience less pain, and conversely, people with low endorphin levels experience very high levels of pain. Some pain relief measures can rely on endorphins, which can be achieved through massage in areas of the body that can stimulate or release endorphin hormones to reduce pain.

Endorphin massage can also stimulate the release of oxytocin, a hormone that can stimulate contractions. Endorphin massage is very beneficial because it can provide comfort, relaxation and calmness to women who are pregnant and giving birth. Additionally, endorphin massage therapy can also restore heart rate and blood pressure to normal levels. This is why this therapy can assist and facilitate the labour process (Dewi, 2023).

The results of the study show that the Mann-Whitney test with SPSS gave a p-value of 0.289, which is greater than 0.05, so it can be concluded that there is no significant difference between oxytocin massage and endorphin massage in reducing the labour pain scale at RA Kartini Hospital in Jepara. This indicates that both oxytocin and endorphin massage equally reduce the labour pain scale during the first stage of labour at RA Kartini General Hospital in Jepara, as seen from the difference in pain levels before and after each group.

There is no difference between endorphin and oxytocin massage in reducing pain intensity in labouring mothers, as both interventions are equally effective. Consistent with Tanaiyo & Mulyaningsih, (2025) both showed a significance value of 0.051, which is greater than 0.05. It was concluded that there was no significant difference between the endorphin massage group and the oxytocin massage group in terms of pain intensity in labouring mothers at Toto Kabila Hospital (Nurbaeti et al., 2024).

Although endorphin massage and oxytocin massage use different mechanisms to reduce pain, both have similar results in reducing pain intensity. Endorphin massage works by stimulating the release of endorphin hormones, which have natural analgesic effects, while oxytocin massage stimulates the release of oxytocin hormones, which have relaxing and calming effects (Lubis, Aprilia, Syarifah, & Primasari, 2025). Both hormones affect the central nervous system and help reduce pain perception, thereby reducing the intensity of pain felt during labour.

According to pain management theory, endorphin massage and oxytocin massage can be considered non-pharmacological interventions that utilise the body's natural mechanisms to reduce pain (Iryani & Simanjuntak, 2025). The combination of the physiological and psychological effects of these two types of massage helps mothers feel more relaxed and better able to cope with the pain that arises during labour. By increasing the release of calming hormones, both endorphins and oxytocin, these massages maximise the body's ability to reduce pain naturally (Himawati & Kodiyah, 2021).

According to researchers, endorphin massage and oxytocin massage have the same effectiveness in reducing pain intensity in mothers in labour because both directly or indirectly trigger the release of natural hormones in the body that have pain-relieving and relaxing effects. Thus, massages that stimulate certain points or provide comfortable pressure can trigger a positive stress response, which then stimulates the release of endorphins and oxytocin. Both techniques can be used together or separately depending on the preferences and condition of the labouring mother, as both have been proven to provide similar effects in labour pain management.

## CONCLUSION

The results showed that the Mann-Whitney test with SPSS had a p-value of 0.289, which was greater than 0.05. Therefore, it can be concluded that there was no significant difference between oxytocin massage and endorphin massage in reducing the labour pain scale at RA Kartini Hospital in Jepara.

## SUGGESTION

The results of this study are expected to serve as a reference source and preliminary data for future researchers interested in examining labour pain management. Other researchers are advised to develop additional variables such as anxiety levels and duration of labour, as well as to compare other non-pharmacological interventions in order to obtain different results.

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