Griya Widya: Journal of Sexual and Reproductive Health, 6(1) 2026, 31-42
Available at: https://journal.nursscienceinstitute.id/index.php/griyawidya
EISSN: 2809-6797




# The Effect of Complementary Therapy Using Endorphin Massage on First-Stage Labor Pain Among Women in Labor

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Submitted: 2026-10-22
Accepted: 2026-11-18
Published: 2026-11-24
DOI: 10.53088/griyawidya.v6i1.3795

**Keywords:**

*Endropine*
*Massage*
*Labor Pain*
*Women in Labor*

**Abstract**

***Background:*** *Inadequately managed labor pain can cause anxiety, increased blood pressure, heart rate, respiratory rate, and muscle tension, potentially disrupting uterine contractions and labor progress.* One non-pharmacological method that can be used to reduce labor pain is *endorphin massage*

***Methods:*** *This study used a pre-experimental one-group pretest-posttest design. Endorphin massage was administered to 15 women in the first stage of labor selected through purposive sampling. Data were collected using the Numeric Rating Scale (NRS) and analyzed through univariate and bivariate analyses, with a paired-sample t-test.*

***Results:*** *Pain intensity decreased following the intervention. Before endorphin massage, 8 respondents (53%) experienced severe pain and 7 (47%) moderate pain. After the intervention, 9 respondents (60%) experienced mild pain and 6 (40%) moderate pain. The mean pain score decreased from 6.27 to 3.53, representing a reduction of 2.74 points. The paired-sample t-test revealed a statistically significant difference ($p < 0.001$).*

***Implications:*** *Endorphin massage can serve as an alternative non-pharmacological complementary therapy for reducing pain during the first stage of labor. Its simplicity, affordability, and lack of specialized equipment make it a practical intervention for midwives to integrate into maternity care.*

***Novelty:*** *This study introduces endorphin massage as a complementary pain management intervention at Wita Medan Denai Clinic, where it had not previously been incorporated into labor care services. The findings provide preliminary empirical evidence supporting its potential as a non-pharmacological approach to labor pain management.*

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## INTRODUCTION

Childbirth is a natural physiological process; however, it is often accompanied by pain caused by uterine contractions, cervical dilatation, and the movement of the fetus through the birth canal. The intensity of labor pain varies among women and may be influenced by physiological, psychological, and environmental factors. Unmanaged labor pain can cause maternal discomfort, anxiety, fear, and physical exhaustion. Furthermore, excessive stress during labor may affect maternal physiological responses, including increased blood pressure, heart rate, respiratory rate, and muscle tension, potentially interfering with the mother's ability to cope with childbirth (Rejeki 2020).

A study published in 2023 reported that, in North Sumatra Province in 2020, approximately 54% of primigravida women experienced severe labor pain, while 46% experienced moderate to mild pain (Siregar, Siregar, dan Batubara 2023).

Several approaches can be used to manage labor pain, including pharmacological and non-pharmacological interventions. Non-pharmacological methods have gained attention as complementary approaches because they can be applied without medication and may support maternal comfort during childbirth. One such intervention is endorphin massage, a gentle-touch massage technique intended to stimulate the body's natural pain-relieving mechanisms (Ahmad et al. 2023).

Endorphin massage involves gentle stimulation of the skin, particularly around the neck, shoulders, and back. This stimulation is believed to activate sensory nerve pathways and promote the release of endorphins, which are endogenous substances involved in pain modulation. Through this mechanism, endorphin massage may help reduce pain perception, encourage relaxation, and improve maternal comfort during labor (Natika 2026;Ahmad et al. 2023).

Previous studies have reported positive outcomes regarding the use of endorphin massage for labor pain management (Winancy, Rastika, & Asri 2023) found that endorphin massage significantly reduced labor pain intensity. Similarly, Antika et al. (2025) reported a decrease in pain levels among primigravida women following the intervention. More recent findings by Utami et al. (2026) also support the potential effectiveness of endorphin massage as a complementary approach to labor pain management.

A preliminary study conducted at Wita Midwife Clinic in Medan Denai revealed that endorphin massage had not been routinely implemented as a complementary intervention for managing labor pain. Interviews with midwives also indicated limited knowledge regarding the technique and its potential benefits. Furthermore, medical record reviews and preliminary observations from January to March 2026 identified 15 women who underwent vaginal delivery at the clinic. Interviews with several women in labor revealed complaints of lower abdominal pain and lower back discomfort, particularly during uterine contractions.

Considering these findings, the implementation of appropriate complementary interventions is important to improve the quality of intrapartum midwifery care. Endorphin massage may represent a practical and accessible non-pharmacological approach because it requires no specialized equipment and can be administered by trained healthcare providers. Therefore, this study focuses on the effect of endorphin massage on labor pain intensity among women in the first stage of labor at Wita Midwife Clinic, Medan Denai.

Labor pain is a physiological condition experienced by most women during childbirth. When not properly managed, labor pain may trigger various physiological and psychological responses, including increased blood pressure, heart rate, respiratory rate, muscle tension,

anxiety, fear, and maternal fatigue. These conditions may reduce maternal comfort and affect the mother's ability to cope with the childbirth process. Data from the North Sumatra Provincial Health Office (2017) indicated that 54% of primigravida women experienced severe labor pain, while the remaining 46% experienced moderate to mild pain. These findings suggest that labor pain remains an important issue requiring attention in midwifery care.

One approach to managing labor pain is through non-pharmacological interventions, particularly massage therapy. According to Ayudita et al. (2023), massage therapy can serve as an alternative pain management method through tactile stimulation of the body surface, which helps promote relaxation and maternal comfort. Physiologically, massage may stimulate sensory nerve pathways and facilitate the release of endorphins, which are naturally occurring substances in the body that play a role in inhibiting the transmission of pain signals (Aryani, Masrul, & Evareny 2015). One approach to managing labor pain is through non-pharmacological interventions, especially massage therapy. According to Ayudita et al (2023) endorphin massage has the potential to serve as a complementary intervention to help reduce pain perception during childbirth.

However, preliminary findings at Wita Midwife Clinic in Medan Denai revealed that endorphin massage had never been implemented as a complementary method for labor pain management. Interviews with midwives indicated that their knowledge regarding the techniques and benefits of endorphin massage remained limited. Furthermore, a review of medical records and preliminary observations conducted from January to March 2026 identified 15 women who underwent vaginal deliveries. Interviews with women in labor revealed complaints of pain, described as stabbing and burning sensations in the lower back, as well as pain in the lower abdomen, particularly during uterine contractions. These complaints increasingly interfered with maternal comfort throughout the labor process.

Research on non-pharmacological approaches to labor pain management has increasingly emphasized the use of complementary interventions that promote relaxation and stimulate the body's natural pain-relieving mechanisms. Endorphin massage is one technique that has received attention because of its potential to reduce pain perception through gentle tactile stimulation (Ajeng, Sari, & Sugiarti 2022).

Several previous studies have investigated the effectiveness of this intervention. (Winancy, Rastika, & Asri 2023) demonstrated that endorphin massage significantly decreased labor pain intensity. Similarly, Sarofah & Waroh (2023) reported an improvement in pain intensity among primigravida women after receiving endorphin massage, with a considerable proportion of participants reporting mild pain following the intervention.

The physiological explanation for these findings is associated with the stimulation of sensory nerve pathways and the release of endogenous endorphins, which contribute to the modulation of pain signals. Ahmad et al. (2023) explained that massage stimulation may activate neurological mechanisms associated with relaxation and pain regulation. Furthermore, Agustin (2025) highlighted the potential relationship between massage intervention, increased endorphin levels, and reduced labor pain.

Although previous studies have established the potential benefits of endorphin massage, further investigation is necessary to evaluate its implementation in different midwifery healthcare settings. The present study extends previous research by examining the application of endorphin massage among women in the first stage of labor at Wita Midwife Clinic, Medan Denai. It also addresses the practical need to introduce

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complementary pain management techniques in a healthcare facility where this intervention has not been routinely implemented.

Previous studies have demonstrated the potential effectiveness of endorphin massage in reducing labor pain intensity. However, the application of this intervention still requires further evaluation across different healthcare settings, particularly in independent midwifery clinics.

A specific gap identified at Wita Midwife Clinic, Medan Denai, is the absence of routine implementation of endorphin massage as a complementary method for labor pain management. Furthermore, preliminary findings indicate that midwives have limited knowledge of the technique, while women in labor continue to experience discomfort during uterine contractions.

Although previous research has examined the relationship between endorphin massage and labor pain reduction, evidence regarding its application in the specific setting of Wita Midwife Clinic remains unavailable. Therefore, this study seeks to address this contextual and implementation gap by investigating the effect of endorphin massage on labor pain intensity among women in the first stage of labor at the clinic. The findings are expected to provide additional evidence regarding the applicability of endorphin massage as a complementary intervention in midwifery practice

## METHOD

### Type and Design

This study employed a quantitative research method with a pre-experimental design using a *one-group pretest-posttest* approach. This design involved a single group of respondents who were assessed before the intervention (*pretest*) and after the intervention (*posttest*). Through this research design, changes in pain intensity could be observed by comparing the measurement results obtained from the same group of respondents (Ridwan & Heryana 2024). The population in this study consisted of women in the first stage of labor who received maternity care at the research site. The sample comprised 15 respondents selected using a *purposive sampling* technique based on the established research criteria.

The research intervention involved the administration of *Endorphin Massage* as a complementary non-pharmacological therapy. The massage technique was performed using gentle touches on the back area, following the direction and procedures of the *Endorphin Massage* technique. The mother's position could be adjusted according to her comfort, including sitting with the body slightly leaning forward or lying in a lateral position. This technique emphasizes gentle touch and is designed to avoid causing discomfort. According to the literature, the duration of the procedure is approximately 10–15 minutes (Kurniasih 2018)

Pain intensity was measured before and after the intervention using a *Numeric Rating Scale* (NRS) observation sheet. The NRS instrument uses a score range of 0–10, with the following categories: no pain (0), mild pain (1–3), moderate pain (4–6), and severe pain (7–10).(Pinzon 2016)

The study data consisted of primary data obtained through observation and measurement of respondents' pain intensity. Univariate analysis was used to describe the respondents' characteristics and the distribution of pain intensity before and after the intervention. Bivariate analysis was conducted to determine the difference in mean pain intensity before and after the administration of *Endorphin Massage* using a *paired-samples*

*t-test*. The normality test was performed using the Shapiro-Wilk method. The statistical significance level was set at $\alpha = 0.05$

## Data and Data Sources

Primary data were obtained directly from 15 women in the first stage of labor who participated in the study and met the predetermined inclusion criteria. Data were collected through observation and measurement of labor pain intensity before and after the administration of *Endorphin Massage*. Pain intensity was measured using the *Numeric Rating Scale* (NRS) observation sheet, with scores ranging from 0 to 10. These data were used to identify changes in labor pain intensity following the *Endorphin Massage* intervention.

Secondary data were obtained from documentation at the research site, records of the number of women in the first stage of labor, and relevant literature sources, including reference books, scientific journals, and previous research findings related to *Endorphin Massage* and labor pain intensity. Secondary data were used to support the implementation and discussion of the study.

## Data collection technique

**Observation**

Data were collected through direct observation and measurement of labor pain intensity using the Numeric Rating Scale (NRS). Data collection was conducted in two stages: before the intervention (pretest) and after the intervention (posttest). Initially, the researcher observed and measured the respondents' labor pain intensity during the first stage of labor before the administration of Endorphin Massage. Pain intensity was assessed using an NRS observation sheet, with scores ranging from 0 to 10. Subsequently, the respondents received Endorphin Massage, which involved gentle touch techniques applied to the back area for approximately 10–15 minutes according to the established procedure. After the intervention, labor pain intensity was reassessed using the same NRS instrument. All observation and measurement results were recorded on the observation sheet and used to compare pain intensity before and after the intervention

**Interview**

Interviews were conducted directly with respondents using a structured interview guide to obtain supporting information regarding their experiences of labor pain before and after the Endorphin Massage intervention.

Interview Before the Intervention (Pretest)

- Do you currently experience pain during the labor process?
- Which part of your body feels the most pain?
- How would you describe the pain you are experiencing?
- Does the pain interfere with your comfort?
- What do you feel when a contraction occurs?

Interview After the Intervention (Posttest**)**

- How do you feel after receiving the Endorphin Massage intervention?
- Have you experienced any changes in pain intensity after receiving the massage?
- Does the Endorphin Massage intervention make you feel more comfortable?
- Do you find the touch or massage technique comfortable?
- Do you feel that the Endorphin Massage intervention has helped you during the labor process?

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## Data Validity

Data validity in this study was maintained through the use of a standardized measurement instrument, namely the Numeric Rating Scale (NRS), to assess labor pain intensity before and after the Endorphin Massage intervention. The NRS is a commonly used instrument for measuring subjective pain intensity, with scores ranging from 0 to 10, where 0 indicates no pain and 10 indicates the worst possible pain. To ensure consistency and accuracy, pain intensity measurements were conducted using the same instrument and measurement procedures for all 15 respondents, both before (pretest) and after (posttest) the intervention. The Endorphin Massage intervention was administered according to established procedures, with a duration of approximately 10–15 minutes.

## Data analysis

The data obtained in this study were analyzed using univariate and bivariate analyses. Univariate analysis was performed to describe the characteristics of the respondents and the distribution of labor pain intensity before and after the Endorphin Massage intervention. The results were presented in the form of frequency distributions, percentages, means, and standard deviations, as appropriate.

Bivariate analysis was conducted to determine the difference in labor pain intensity before and after the Endorphin Massage intervention. Prior to hypothesis testing, the normality of the data was assessed using the Shapiro-Wilk test because the sample consisted of 15 respondents. If the data were normally distributed ($p > 0.05$), a paired-samples t-test was used to analyze the differences in mean pain intensity between the pretest and posttest measurements. If the data were not normally distributed ($p \leq 0.05$), the Wilcoxon signed-rank test was considered as an alternative. The statistical significance level was set at $\alpha = 0.05$. A p-value less than 0.05 indicated a statistically significant difference in labor pain intensity before and after the Endorphin Massage intervention.

## RESULT

### Univariate Analysis

### Characteristics Category

**Table 1.** Distribution of Respondents' Characteristics

| Variable | Frequency | % |
|---|---|---|
| **Maternal Age (years)** | | |
| 20 | 2 | 13,3 |
| 23 | 2 | 13,3 |
| 24 | 1 | 6,7 |
| 26 | 3 | 20,0 |
| 28 | 2 | 13,3 |
| 29 | 1 | 6,7 |
| 31 | 2 | 13,3 |
| 35 | 2 | 13,3 |
| **Parity** | | |
| Primigravida | 7 | 47 |
| Multigravida | 8 | 53 |
| **Education** | | |
| SMP | 2 | 13 |
| SMA | 8 | 53 |
| PT | 5 | 33 |
| Occupation | | |
| Employed | 8 | 53 |
| Not Employed | 7 | 46 |
| **Total** | **15** | **100** |

*Source: Primary Data*

Based on the results presented in Table 1, it can be observed that among the 15 respondents, the majority of women in labor were aged 20–35 years (73%). In terms of parity, most respondents were multigravida (53%). Regarding educational level, the majority had completed senior high school (53%), while in terms of occupation, most respondents were unemployed (46%).

**Table 2.** Pain Levels Before and After the Administration of Endorphin Massage

| No. | Pain Before the Intervention | F | % | Pain After The Intervention | f | % |
|---|---|---|---|---|---|---|
| 1. | Moderate Pain | 7 | 47 | Mild Pain | 9 | 60 |
| 2. | Severe Pain | 8 | 53 | Moderate Pain | 6 | 40 |
| | Total | 15 | 100 | Total | 15 | 100 |

*Source: Primary Data*

Based on the results presented in Table 2, it can be observed that among the 15 women in labor, before the intervention, the majority experienced moderate pain, accounting for 7 respondents (47%), while 8 respondents (53%) experienced severe pain. Following the

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intervention, the majority of respondents experienced mild pain, accounting for 9 respondents (60%), while the remaining 6 respondents (40%) experienced moderate pain.

### Bivariate Analysis

To determine the effect of *Endorphin Massage* on pain during the first stage of labor at Wita Midwife Clinic in Medan Denai, the results are presented in the following table

**Table 4.** Results of the Paired-Samples t-Test

| Variabel | | Intervensi | | | *Sig.* |
|---|---|---|---|---|---|
| | | Mean | Difference | SD | |
| ***Administration of Endorphin Massage*** | Pre | 6,27 | 2,74 | 1,49 | 0,0001 |
| | Post | 3,53 | | 1,13 | |

Based on the results presented in Table 5, the paired-samples t-test revealed a *p-value* of 0.0001 (less than 0.05), indicating a statistically significant difference between the mean pre-test and post-test scores. Therefore, it can be concluded that the administration of *Endorphin Massage* has a significant effect on pain intensity during the first stage of labor among women giving birth at Wita Midwife Clinic in Medan Denai.

## DISCUSSION

The results of the study demonstrated a decrease in pain intensity during the first stage of labor following the administration of *Endorphin Massage*. Based on the study summary data, the mean pain intensity score before the intervention was 6.27, which decreased to 3.53 after the intervention, representing a difference of 2.74 points. In addition to the changes in mean scores, the distribution of pain categories also showed a shift from severe and moderate pain to mild and moderate pain.

Before the intervention, the majority of respondents experienced severe pain, accounting for 8 women (53%). This condition may be associated with the physiological processes of labor, particularly uterine contractions and cervical changes during the first stage of labor. At this stage, uterine contractions play an important role in cervical effacement and dilatation, as well as facilitating fetal descent. These physiological activities generate pain stimuli, the intensity of which may vary among individual women (Permata Sari et al. 2018)

Following the administration of *Endorphin Massage*, the majority of respondents experienced mild pain, accounting for 9 women (60%), while 6 women (40%) experienced moderate pain. These changes suggest that the application of therapeutic touch may serve as a complementary approach to helping women cope with discomfort during labor.

Progressive cervical dilatation may cause back pain due to nerve stimulation in the sacral plexus. This condition can trigger increased sympathetic nervous system activity, characterized by changes in blood pressure, heart rate, respiratory rate, and skin color. If pain is not properly managed, it may increase anxiety, tension, fear, and stress in women during labor. The intensity of labor pain generally increases as cervical dilatation progresses. (Pratiwi et al. 2021)

Heoretically, the effect of massage on pain perception can be explained through the mechanism of pain modulation. Tactile stimulation of the skin is detected by sensory receptors and transmitted through nerve fibers to the central nervous system. This stimulation may influence the processing of pain impulses at the spinal cord level, as described in the *Gate Control Theory* of pain. This mechanism allows non-painful stimuli to modulate the transmission of painful stimuli, thereby potentially reducing pain perception.(Ahmad et al. 2023). In addition to the neurological mechanisms, therapeutic touch may also produce a relaxing effect. When women feel more comfortable, muscle tension and anxiety may decrease. A calmer psychological state can help women adapt to uterine contractions and improve their ability to cope with the labor process

An obstetrician, Constance Palinsky, was inspired to use *Endorphin Massage* to reduce or alleviate pain in women preparing for childbirth. She developed *Endorphin Massage*, a technique involving gentle touch and light massage that can help normalize heart rate and blood pressure, as well as promote relaxation in pregnant women by stimulating feelings of comfort through skin contact. Research findings have demonstrated that this technique can increase the release of oxytocin, a hormone that facilitates the labor process (Wulandari, & Keb 2021)

The findings of this study are consistent with those of Winancy et al. (2023), who reported that the application of *Endorphin Massage* could help reduce pain levels in women during labor (Winancy, Rastika, & Asri 2023). These consistent findings suggest that gentle touch and light massage techniques have the potential to be utilized as a complementary intervention in labor pain management.

The study conducted by Intensitas nyeri diukur sebelum dan sesudah intervensi menggunakan lembar observasi *Numeric Rating Scale* (NRS). Instrumen NRS ini menggunakan rentang skor 0–10, dengan kategori sebagai berikut: tidak ada nyeri (0), nyeri ringan (1–3), nyeri sedang (4–6), dan nyeri berat (7–10). also reported changes in pain intensity categories among primigravida women following the administration of *Endorphin Massage*. Before the intervention, the majority of respondents experienced severe pain, whereas after the intervention, there was an increase in the proportion of respondents reporting mild pain (10). These findings support the results of the present study, particularly in demonstrating changes in pain perception following the administration of massage. (Sarofah & Waroh 2023)

The study conducted by Antika et al. (2025) also examined the application of *Endorphin Massage* to reduce pain intensity during the active phase of the first stage of labor. Meanwhile, the study by Utami et al. (2026) investigated the combination of *Endorphin Massage* and breathing relaxation techniques as an approach to labor pain management. Both studies provide evidence that touch-based and relaxation interventions are relevant approaches to be further developed in midwifery care.

Several findings of this study have practical implications for clinical management in maternity clinics. *Endorphin Massage* is a non-pharmacological therapy that is low-cost, safe, and easy to implement. This intervention does not require advanced technology, making it highly suitable for use in midwifery clinics. The results of this study indicate that this method can be effectively implemented even in healthcare settings with limited resources. Therefore, *Endorphin Massage* can be recommended as a non-pharmacological

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pain management approach for women who wish to minimize the use of pharmacological analgesia.

The reduction in mean pain intensity reported in this study indicates the potential of *Endorphin Massage* as a complementary intervention in pain management during the first stage of labor. These findings may serve as a consideration for healthcare professionals in expanding the range of non-pharmacological approaches aimed at promoting maternal comfort.

However, the application of these research findings should be approached with caution. The limited number of respondents and the absence of a control group mean that the results cannot yet be widely generalized. Furthermore, pain intensity is a subjective experience influenced by various factors, such as parity, anxiety, labor progress, companion support, and individual differences in pain tolerance.

## CONCLUSION

### Novelty and Contribution

The novelty of this study lies in demonstrating the effectiveness of Endorphin Massage as a complementary non-pharmacological intervention for reducing labor pain intensity among women in the first stage of labor at Wita Midwife Clinic, Medan Denai. The findings provide empirical evidence of a reduction in labor pain intensity following the intervention, with the mean pain score decreasing from 6.27 before the intervention to 3.53 after the intervention, representing a reduction of 2.74 points. Furthermore, the statistical analysis revealed a significant difference between pre-intervention and post-intervention pain intensity ($p < 0.001$). The contribution of this study is to provide additional evidence regarding the potential application of Endorphin Massage as a simple, non-pharmacological complementary therapy in maternity care. This technique may serve as an alternative intervention for midwives to help improve maternal comfort and support pain management during the first stage of labor. In addition, the findings may serve as a reference for healthcare professionals and future researchers in developing evidence-based complementary interventions for managing labor pain. The study also highlights the importance of integrating non-pharmacological approaches into maternal healthcare services to promote more comfortable and supportive childbirth experiences.

### Limitation and Future Study

This study has several limitations that should be considered when interpreting the findings. First, the study involved a relatively small sample of only 15 respondents from a single midwifery clinic, namely Wita Midwife Clinic in Medan Denai. Therefore, the findings may not be generalizable to a broader population of women in labor or to other healthcare settings. Second, the study employed a pre-experimental design using a one-group pretest-posttest approach without a control group. Consequently, it was difficult to determine whether the reduction in labor pain intensity was solely attributable to the Endorphin Massage intervention or was also influenced by other factors, such as the natural progression of labor, maternal psychological conditions, individual pain tolerance, and other supportive interventions. Third, pain intensity was assessed using the Numeric Rating Scale (NRS), which relies on subjective self-reported measurements. Differences in individual pain perception may have influenced the reported pain scores. Future studies are recommended to involve larger sample sizes and multiple healthcare facilities to improve the generalizability of the findings. A randomized controlled trial or quasi-experimental

design with a control group is also recommended to provide stronger evidence regarding the effectiveness of Endorphin Massage in reducing labor pain. Furthermore, future researchers should consider controlling for potential confounding factors, such as maternal age, parity, cervical dilatation, labor progression, and other pain management interventions. Further research may also investigate the duration and frequency of Endorphin Massage to determine the most effective intervention protocol for improving maternal comfort during labor.

## Implication

The findings of this study suggest that Endorphin Massage may be considered a complementary non-pharmacological intervention to help reduce labor pain intensity and improve maternal comfort during the first stage of labor. Midwives are encouraged to consider incorporating this technique into maternity care according to the mother's needs, consent, and comfort. Future studies should involve larger sample sizes, multiple research settings, and control groups to provide stronger evidence regarding the effectiveness of Endorphin Massage in managing labor pain

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