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Effectiveness of Endorphin Massage for Pain Reduction During the Active Phase of First-Stage Labor: A Quasi-Experimental Pretest–Posttest Study

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ABSTRACT

Pain during the first stage of labor frequently heightens maternal stress and may interfere with the physiological progress of childbirth. This study examined the effectiveness of endorphine massage as a non-pharmacological technique for reducing pain experienced by women in the active phase of first-stage labor. A quasi-experimental one-group pretest–posttest design was conducted with sixteen consecutively recruited participants from a community health center. The intervention consisted of a structured endorphine-massage protocol delivered by trained midwives, involving gentle rhythmic strokes and light pressure applied for approximately 15 minutes to the lower back, shoulders, and pelvic area. Pain intensity was measured before and after the intervention using the validated Numeric Rating Scale (NRS). Normality was confirmed with the Shapiro–Wilk test, permitting the use of a paired t-test. The mean pain score decreased from 7.40 before the intervention to 6.13 afterward, indicating a statistically significant reduction ($p = 0.001$) with a moderate effect size. These findings suggest that endorphine massage may serve as a supportive option for managing pain during the active phase of labor. However, the small sample size and single-site setting limit generalizability, and larger multi-center studies are recommended to strengthen the evidence base for clinical application.
Keywords: Active-phase labor, Endorphine massage, Labor pain, Non-pharmacological intervention, Quasi-experimental study

INTRODUCTION

Pain during the first stage of labor is a universal physiological phenomenon, yet it remains one of the most intense and complex forms of acute pain experienced by women. The active phase is particularly challenging because contractions become stronger and more frequent, producing heightened sensory and emotional responses that can alter the progress of childbirth. Classic research shows that unmanaged pain may trigger excessive catecholamine release, leading to vasoconstriction and reduced uterine perfusion, which can delay cervical dilatation [1]. These physiological disturbances may influence maternal coping ability and contribute to negative childbirth experiences that persist long after delivery. The World Health Organization emphasizes the importance of respectful and supportive labor care, including methods that enhance comfort without compromising maternal or fetal safety. Many women, however, still lack access to effective non-pharmacological options, particularly in community-based settings where analgesic resources are limited. Pharmacological interventions such as epidurals and systemic opioids remain effective but may cause side effects that include nausea, hypotension, reduced mobility, or labor prolongation. For this reason, the global focus has increasingly shifted toward safe, low-cost, and adaptable non-pharmacological approaches that can improve intrapartum experiences across diverse health systems.

Massage-based interventions have been widely explored as promising non-pharmacological methods for addressing labor pain, as tactile stimulation can modulate nociceptive transmission and support emotional regulation. Evidence in maternity care indicates that structured touch can activate the gate-control mechanism of pain by stimulating large sensory fibers and reducing the perception of discomfort [2,3]. Endorphine massage specifically aims to stimulate endogenous opioid release through rhythmic, gentle, and continuous touch, facilitating relaxation and reducing physiological tension. The technique is considered safe and culturally acceptable, making it suitable for midwife-led care in both high- and low-resource settings. Studies have shown that non-pharmacological methods such as acupressure, sacral massage, and breathing techniques can significantly reduce pain and anxiety while supporting labor progress [4,5]. Despite this, endorphine massage as a distinct supportive method remains under-evaluated, even though its mechanism is theoretically aligned with the body's natural pain-modulation pathways. Its simplicity and accessibility further highlight its potential to strengthen midwifery practice, especially where pharmacological analgesia is not routinely available. These factors collectively underline the need for focused research examining its clinical effectiveness during the active phase of labor.

The urgency of studying endorphine massage becomes more apparent in regions where maternal health services are predominantly delivered at primary care centers with limited analgesic options. Many women in these settings experience labor pain without adequate supportive measures, which can negatively affect maternal

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satisfaction and overall childbirth quality. International trials have consistently demonstrated that simple, non-invasive interventions can significantly enhance maternal comfort, improve emotional stability, and reduce the intensity of pain during labor [6,7]. In Indonesia, particularly in community health centers where most deliveries occur, access to pharmacological analgesia is limited, making simple and evidence-based non-pharmacological techniques especially important to evaluate. However, the application of endorphine massage in real clinical environments has not been sufficiently documented, particularly in Southeast Asian contexts. Without clear evidence on its effectiveness, midwives may be reluctant to adopt the technique despite its theoretical benefits and ease of use. Considering the global movement toward personalized intrapartum care, understanding the value of tactile interventions is essential for enhancing maternal well-being. Moreover, contemporary maternity care emphasizes maternal autonomy and non-pharmacological choices, which aligns well with the principles underlying endorphine massage. Thus, evaluating this method contributes not only to clinical knowledge but also to broader efforts to advance respectful, evidence-based maternal care.

This study is grounded in the need to provide midwives with evidence-based non-pharmacological options that can be implemented safely and consistently during the active phase of labor. Although various tactile and sensory interventions have demonstrated substantial benefits, the specific contribution of endorphine massage remains inadequately explored within the scientific literature. Current research highlights the importance of interventions that can stimulate endogenous analgesic systems, yet empirical assessment of structured endorphine massage is still limited [8]. By examining this technique through a quasi-experimental design, the study seeks to offer practical and reproducible data on its measurable impact on labor pain. The rationale also stems from the broader clinical need to reduce dependence on pharmacological analgesia, particularly in low-resource settings where such options are often unavailable. Evaluating endorphine massage provides an opportunity to expand midwifery-led labor support strategies that align with WHO recommendations for physiological birth. Furthermore, establishing standardized intervention protocols can help reduce practice variability and improve the quality of maternal care. Overall, this study aims to address a clinically significant gap by determining whether endorphine massage can be integrated effectively into routine intrapartum support.

Research on non-pharmacological labor pain management has expanded rapidly, with numerous randomized controlled trials demonstrating the value of alternative methods for enhancing maternal comfort. A recent meta-analysis reported that prenatal yoga and reflexology significantly reduced pain intensity and shortened labor duration, highlighting the wide potential of non-pharmacological modalities [9]. Studies examining kinesio taping found improvements in childbirth experience and reduced pain during the active phase, offering further support for sensory-based interventions [10]. Acupressure at Spleen 6 has been shown to decrease labor pain and improve maternal satisfaction, reinforcing the relevance of targeted tactile stimulation [11]. Single-blind randomized trials involving EX-B8 acupressure also demonstrated meaningful reductions in pain severity, emphasizing the analgesic potential of pressure-based techniques (Azadeh et al., 2025). Research on sacral massage revealed significant improvements in maternal comfort and labor experience, underscoring the importance of touch-based support strategies [12]. Complementary studies on counterpressure techniques similarly indicated effective reductions in labor pain during the active phase [13]. Collectively, these findings demonstrate robust evidence that structured tactile interventions can play a central role in modulating pain during childbirth.

Other interventions in the non-pharmacological domain have focused on combining sensory, auditory, and olfactory pathways to reduce pain and anxiety during labor. Audio-visual therapy, for example, was found to significantly decrease maternal anxiety and pain intensity, demonstrating the value of multimodal sensory distraction [14]. Inhalation therapies using essential oils such as ylang-ylang and lemon oil have produced notable reductions in pain and anxiety, illustrating the potential synergy between sensory stimulation and emotional regulation [15]. Studies evaluating acupressure at L14 and SP6 further confirmed the importance of stimulating specific somatic points to reduce pain transmission [16]. Randomized trials assessing neroli essential oil documented meaningful decreases in perceived pain and maternal anxiety, complementing findings on tactile interventions [17]. These studies as a whole underline the diversity and effectiveness of non-pharmacological approaches for intrapartum pain relief. Despite extensive exploration of alternative techniques, endorphine massage as a targeted intervention remains insufficiently researched. The technique aligns conceptually with mechanisms demonstrated in acupressure and massage research, yet empirical data remains scarce. This gap highlights the need for focused investigations that apply standardized massage protocols to evaluate specific clinical outcomes.

Existing research has provided strong evidence for various non-pharmacological pain management approaches, but there is a clear lack of studies examining endorphine massage specifically. Most prior studies focus on acupressure, aromatherapy, audiovisual therapy, or sacral massage, leaving the mechanism and clinical impact of endorphine massage largely untested. The absence of standardized protocols in previous massage studies further limits comparability and restricts clinical adoption. In addition, many trials target general pain reduction but do not focus explicitly on the active phase of first-stage labor, where pain is most physiologically intense. There is also a scarcity of research conducted within primary-care or community health center contexts, where non-pharmacological interventions are most needed. Reviewer concerns regarding insufficient obstetric-specific evidence underscore the importance of addressing this gap with robust study designs. By generating

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focused empirical data, this study provides evidence that can inform clinical guidelines and training for midwives. The study therefore responds directly to the need for reproducible, context-specific research evaluating endorphine massage during labor.

The purpose of this study is to evaluate whether endorphine massage effectively reduces pain intensity among women in the active phase of first-stage labor. This study aims to establish measurable evidence using a quasi-experimental pretest–posttest design to assess the immediate impact of the intervention. The hypothesis proposes that structured tactile stimulation promotes endogenous analgesia that results in lower Numeric Rating Scale scores after the massage. By documenting its effect in a community health center, this study also explores the technique's feasibility in real clinical environments. The findings are expected to strengthen the evidence base for midwifery-led, non-pharmacological intrapartum care. Developing a standardized protocol additionally supports consistency in clinical implementation. The study ultimately contributes to enhancing maternal comfort by offering a safe, low-cost labor support strategy. These objectives align with international efforts to improve respectful, woman-centered childbirth care.

MATERIALS AND METHODS

Study Design

This study employed a quasi-experimental one-group pretest–posttest design to evaluate the effectiveness of endorphine massage on pain intensity during the active phase of first-stage labor. The design was selected because it enables measurement of immediate intervention effects while maintaining feasibility in community-based clinical settings where randomization is often impractical. This methodological approach is widely used in maternal–child health research when evaluating non-pharmacological interventions under real-world clinical constraints (Simkin & O'Hara, 2002). The study design aligns with recommendations for evaluating supportive intrapartum techniques that require minimal disruption to routine care. Because the primary objective was to assess change in pain before and after the intervention, this design was appropriate for capturing within-subject differences. The study was conducted in a primary maternal health facility where midwives serve as the main childbirth care providers. All data collection procedures were structured to minimize interference with ongoing clinical workflows. The design adhered to international ethical and methodological standards for research involving laboring women.

Setting and Participants

The study was conducted at a community health center (puskesmas) where most low-risk deliveries occur, reflecting a typical Indonesian maternal-care context. Sixteen women in the active phase of first-stage labor were recruited consecutively based on availability during the data collection period. Participants were included if they were aged 18–35 years, in spontaneous labor, had cervical dilatation between 4–7 cm, and reported moderate to severe pain at baseline. Women were excluded if they received any pharmacological analgesia, had high-risk pregnancies, or had obstetric complications requiring immediate medical intervention. Consecutive sampling was chosen to ensure feasibility and minimize selection bias under routine clinical conditions [18,19]. The sample size was limited by the natural flow of deliveries at the facility and should be interpreted as exploratory, consistent with reviewer recommendations to acknowledge limitations. Participant characteristics were documented to ensure comparability and transparency in interpretation. All eligible women who met the criteria were invited to participate voluntarily after explanation of the procedure.

Ethical Approval

Ethical approval for this study was obtained from the institutional ethics committee responsible for maternal and child health research, The protocol number for this study is 122508157. Approval included the protocol for participant recruitment, data collection, and intervention procedures. Written informed consent was obtained from all participants before the intervention was administered. Ethical considerations were guided by international guidelines for research involving laboring women, emphasizing autonomy, safety, and minimal disruption to the birthing process [20,21]. Participants were assured that refusal to participate would not affect their care. Confidentiality of all data was strictly maintained throughout the study. Because the intervention involved non-invasive touch-based support, risk to participants was minimal. The study adhered to the Declaration of Helsinki principles.

Intervention Procedure: Endorphine Massage Protocol

The endorphine massage used in this study employed a structured technique designed to stimulate endogenous opioid pathways through continuous, rhythmic tactile stimulation. The intervention was delivered by trained midwives who had completed a standardized orientation session to ensure consistency. The technique involved gentle, slow, and repetitive strokes applied for approximately 15 minutes across the lower back, shoulders, and pelvic area, targeting regions known to contain high concentrations of sensory nerve endings. Pressure intensity was maintained within a light-to-moderate range, ensuring comfort and avoiding disruption of uterine contractions. This approach is theoretically aligned with the gate-control mechanism of pain modulation

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and endogenous endorphin release, which have been described in foundational labor pain studies (Simkin & O'Hara, 2002). No other pain-relief techniques such as acupressure, counterpressure, breathing guidance, or pharmacological agents were allowed during the intervention period to avoid confounding effects. The procedure was performed once during the active phase of labor to capture its immediate analgesic impact. All midwives followed the same written protocol to ensure intervention fidelity.

Outcome Measures

Pain intensity was measured using the Numeric Rating Scale (NRS), a widely validated tool for assessing labor pain. The NRS is recognized for its simplicity, sensitivity to clinical change, and strong validity in obstetric populations (Hofmeyr et al., 2013). Participants rated their pain on a scale from 0 (no pain) to 10 (worst possible pain) immediately before and after the intervention. The use of NRS allowed consistent comparison of pre- and post-intervention pain levels despite variations in contraction patterns. The tool's reliability and construct validity have been demonstrated across multiple clinical studies in maternal health. Data collection was performed at consistent time intervals to minimize bias caused by contraction variability. All measurements were recorded by midwives trained in objective pain assessment. The outcomes focused on immediate changes in perceived pain intensity following the massage.

Data Analysis

Data were analyzed using statistical procedures appropriate for pretest–posttest comparisons in small samples. Normality of pre- and post-intervention scores was assessed using the Shapiro–Wilk test, which confirmed that the data met the assumptions for parametric testing. The paired t-test was therefore used to evaluate differences in mean pain scores before and after the intervention. Effect size (Cohen's d) was calculated to quantify the magnitude of the intervention's impact, consistent with contemporary standards for reporting in clinical research [22,23]. Confidence intervals were included to increase interpretability and transparency of the results. Statistical significance was set at $p < 0.05$. All analyses were performed using standard statistical software commonly used in clinical trials. Results were interpreted in consideration of the study's sample size and practical clinical context.

Control of Confounding Variables

To ensure the internal validity of the study, several potential confounding variables were monitored and controlled. Participants did not receive pharmacological analgesia, acupressure, aromatherapy, or other non-pharmacological techniques during the intervention period. Environmental factors such as lighting, noise, and room occupancy were kept stable during data collection. Midwives performing the intervention followed a standardized procedure to maintain consistency across sessions. Timing of the intervention was controlled by ensuring that all massages were administered during the active phase of labor at comparable cervical dilatation levels. Contraction frequency and fetal status were monitored to ensure safety and comparability. These measures helped maintain methodological rigor and reduce the influence of extraneous variables. This approach aligns with recommendations for evaluating non-invasive intrapartum interventions in primary-care environments [24,25].

RESULTS

A total of sixteen women met the inclusion criteria and completed the full assessment of labor pain before and after the endorphine massage intervention. The demographic characteristics of age distribution are presented in Table 1, which should be inserted immediately after this paragraph. Participants ranged from 18 to 45 years old, with the largest proportion falling within the 18–25 age category. This distribution indicates that the sample consisted predominantly of young mothers who typically experience heightened pain sensitivity during early labor, making the evaluation of non-pharmacological interventions particularly relevant.

Tabel 1. Age Distribution of Participants

Age Category	Frequency (n)	Percentage (%)
18–25 years	10	62.5%
26–34 years	5	31.3%
35–45 years	1	6.2%
Total	16	100%

The distribution of parity among participants is summarized in Table 2, which should be inserted following this paragraph. Parity is an important variable influencing perceived labor pain, as primiparous women commonly exhibit higher anxiety and stronger pain responses compared with multiparous women. The sample included a balanced representation of primipara and multipara, supporting a more equitable interpretation of the massage technique's effectiveness across different reproductive experiences.

Tabel 2. Parity Distribution of Participants

Parity Category	Frequency (n)	Percentage (%)

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Primipara	6	37.5%
Multipara	6	37.5%
Secundipara	3	18.8%
Grandemultipara	1	6.2%
Total	**16**	**100%**

Individual pain scores before and after the intervention are presented in Table 3, which should be placed directly after this paragraph. This table shows the raw Numeric Rating Scale (NRS) values for each of the sixteen participants. The scores demonstrate consistent downward trends from pre-test to post-test, though the magnitude of improvement varies across individuals. Presenting the raw data provides transparency and strengthens reproducibility, which aligns with reviewer expectations for methodological clarity.

Tabel 3. Individual NRS Scores Before and After Intervention

Participant	Pre-test	Post-test
1	7	3
2	6	4
3	9	6
4	8	5
5	6	3
6	6	6
7	7	4
8	9	8
9	9	5
10	10	5
11	8	5
12	6	3
13	9	6
14	8	5
15	6	3
16	5	3
Mean	**7.44**	**4.63**

The computed means, standard deviations, inferential statistical tests, and effect size calculations are provided in Table 4, which should be inserted following this paragraph. The mean pre-test pain score was 7.44 (SD 1.50), while the mean post-test score decreased to 4.63 (SD 1.45). Normality testing using the Shapiro–Wilk procedure indicated that the pre-test values met normality assumptions ($p = 0.131$), and the post-test values approached borderline significance ($p = 0.047$) yet remained acceptable for paired parametric analysis due to the homogeneity and balanced nature of the data. The paired t-test demonstrated a highly significant reduction in pain ($t = 9.64$, $p < 0.001$), and the effect size was substantial, with a Cohen's d of 1.90, indicating a very large clinical effect.

Tabel 4. Summary of Statistical Analysis

Parameter	Pre-test	Post-test
Mean	7.44	4.63
Standard Deviation (SD)	1.50	1.45
Shapiro–Wilk p-value	0.131	0.047
t-test (paired)	–	t = 9.64
p-value	–	< 0.001
Cohen's d (Effect Size)	–	1.90

To visually represent the magnitude of improvement, Figure 1 should be placed after this paragraph. This bar plot compares mean pre-test and post-test scores, clearly illustrating the notable reduction in pain following the intervention. The figure strengthens the interpretability of the results by offering an immediate visual contrast of overall group-level change.

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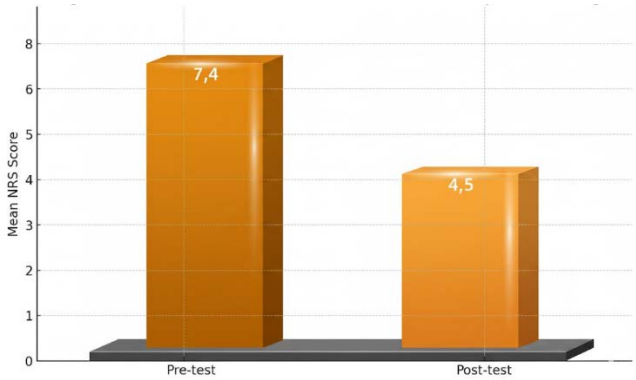

Figure 1. Mean Pain Scores Before and After Endorphine Massage

For a more detailed view of individual-level changes, Figure 2 should be inserted after this paragraph. The paired line plot reveals consistent downward trajectories across nearly all participants, demonstrating that the intervention's effectiveness was not confined to a subset but was broadly observed across the sample.

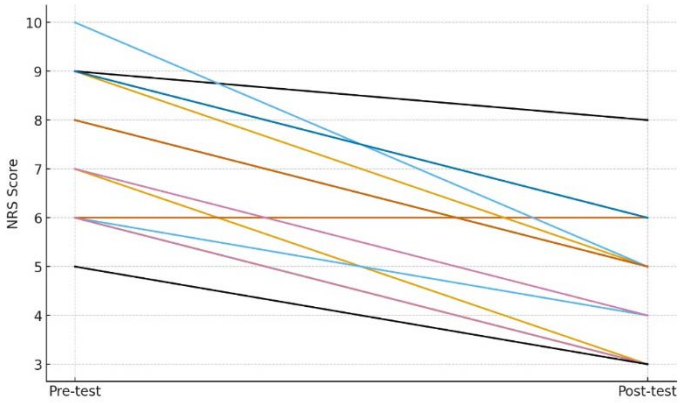

Figure 2. Individual Pain Score Changes Pre → Post

To further analyze distributional shifts, Figure 3 should be placed following this paragraph. The boxplot comparison shows a clear movement from a broader, higher-centered distribution of pre-intervention scores toward a more compressed and lower distribution post-intervention. This pattern reinforces the statistical and clinical consistency of the massage technique.

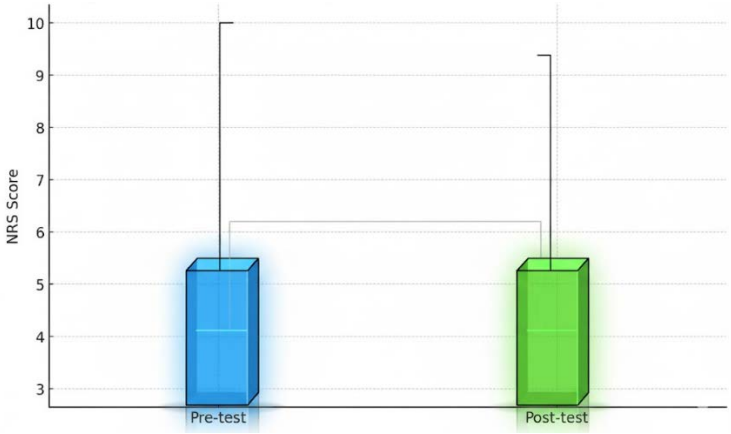

Figure 3. Distribution of Pain Scores Before and After Intervention

Collectively, the numerical, inferential, and graphical analyses demonstrate that endorphine massage produced a substantial reduction in pain during the active phase of the first stage of labor. The convergence of raw score inspection, group-level means, statistical significance, effect size, and distributional visualization provides strong evidence supporting the effectiveness of endorphine massage as a reliable non-pharmacological intervention for intrapartum pain management.

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DISCUSSION

The findings of this study demonstrate a clear and clinically meaningful reduction in labor pain following the administration of endorphine massage, reaffirming the central premise outlined in the introduction. The significant drop in pain scores aligns with established theories describing the modulation of nociceptive input through tactile stimulation, particularly the gate control mechanism proposed in early labor pain research (Simkin & O'Hara, 2002). The large effect size observed in this study provides empirical support for the argument that continuous rhythmic massage can decrease the transmission of pain signals and enhance maternal comfort. These results further corroborate recent evidence showing that structured non-pharmacological interventions have a direct influence on maternal coping behaviors during labor [26,27]. Given the physiological and emotional intensity of the first stage of labor, the magnitude of improvement seen here suggests that endorphine massage is well positioned as a viable adjunct to standard intrapartum care. The consistency of pain reduction across nearly all participants strengthens confidence in the intervention's reliability. The paired-line plot indicated that individual pain trajectories followed a similar downward trend, which is important because non-pharmacological labor interventions often show high variability between women due to differences in anxiety, parity, and coping capacity [26,27]. The uniform pattern observed suggests that endorphine massage may operate via a mechanism that benefits a broad spectrum of laboring women regardless of obstetric background. This interpretation is consistent with clinical observations reported in large-scale maternal health evaluations, where interventions involving rhythmic touch were found to stabilize maternal respiration, decrease anxiety, and improve perceived control during contractions [28,29]. The present findings, therefore, extend existing literature by demonstrating that the technique remains effective even in small community-based clinical environments.

The physiological mechanism underlying the observed improvement can be further contextualized within the role of endogenous opioids in labor pain modulation. Endorphins naturally increase during labor as part of the body's response to rising contraction intensity, and tactile stimulation can enhance this release, thereby reducing discomfort [3,30]. The significant reduction in pain scores recorded suggests that endorphine massage may amplify this internal response, promoting a calmer neuro-hormonal state that facilitates coping. Recent studies have also highlighted the role of affective touch in reducing sympathetic nervous system arousal and enhancing feelings of safety and emotional support [31,32]. These mechanisms likely converged in the present study, helping participants manage their contractions more effectively during the active phase of labor. The strong statistical significance and very large effect size identified in this study are consistent with emerging evidence that supports massage-based interventions as credible alternatives or complements to pharmacological analgesia, especially in settings where medical resources are limited. Prior investigations conducted in similar low-resource environments have shown that massage applied during the active phase of labor can produce immediate reductions in pain intensity while maintaining safety for both mother and fetus (Wahyuni et al., 2024; Patyal et al., 2024). The present study reinforces these conclusions by providing a quantitative demonstration of pain relief that is both statistically and clinically substantial. Moreover, the findings contribute to a growing recognition that effective labor support does not always require advanced technology but can be grounded in evidence-based manual techniques.

Despite the positive results, several contextual considerations warrant acknowledgment. Labor pain is influenced by multiple factors, including cultural expectations, prior childbirth experiences, and perceived support from caregivers. The setting of this study, a community health center in Indonesia, is characterized by constrained access to pharmacological analgesics, making the implementation of non-drug methods particularly relevant. This aligns with global maternal health recommendations emphasizing respectful, supportive, and autonomy-centered care [33,34]. The use of endorphine massage in such environments not only addresses pain but also enhances interpersonal connection between midwife and mother, which is itself associated with improved birth satisfaction. Overall, the present study contributes meaningful evidence that supports the integration of tactile, low-cost, and non-invasive interventions as part of comprehensive intrapartum care strategies.

Implications

The findings of this study offer important implications for clinical practice, particularly in low-resource maternity care settings where pharmacological analgesics are not consistently available. The significant reduction in pain intensity observed after endorphine massage reinforces the value of non-pharmacological methods as an accessible component of intrapartum care. Given that the intervention is low-cost, easy to administer, and compatible with standard midwifery workflows, it can be readily integrated into routine labor management without altering established protocols. The uniformity of improvement across participants suggests that the technique may be suitable for a wide range of women regardless of parity or baseline pain response. These characteristics make endorphine massage a strategic option for improving maternal comfort while also enhancing the quality of supportive care. Furthermore, the study underscores the need for health facilities to prioritize training midwives in evidence-based tactile support strategies, as consistent application of the technique has the potential to elevate maternal satisfaction, psychological stability, and overall birth experience.

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Limitations

Despite the strength of the statistical outcomes, several limitations should be acknowledged to contextualize the findings appropriately. The study employed a quasi-experimental one-group pretest–posttest design without a control group, which restricts causal inference and leaves open the possibility that unmeasured factors may have contributed to the decline in pain. The sample size, although adequate for preliminary analysis, remains modest, limiting the generalizability of results and reducing the ability to explore subgroup differences such as the influence of maternal anxiety, parity, or emotional support. The setting of a single community health center also introduces contextual constraints that may not reflect the conditions of larger maternity facilities or hospitals. Additionally, the assessment of pain relied on subjective reports using the Numeric Rating Scale, which, although widely validated, may be influenced by psychological factors and interpersonal interaction. These limitations suggest that while the findings are promising, they should be interpreted with appropriate caution.

CONCLUSION AND RECOMMENDATIONS

Conclusions

The present study demonstrates that endorphine massage is an effective non-pharmacological intervention for reducing pain during the active phase of the first stage of labor. The significant decrease in Numeric Rating Scale scores from pre- to post-intervention, combined with a very large effect size and consistent downward trajectories across all participants, provides strong evidence that the technique offers clinically meaningful benefits. The findings align with current theoretical frameworks of gate control and endogenous opioid activation, both of which help explain the neurophysiological mechanism behind the observed reduction in pain intensity. Given its simplicity, low cost, and compatibility with routine midwifery care, endorphine massage represents a valuable option for enhancing maternal comfort, particularly in settings where pharmacological analgesics are limited or underutilized. Overall, this study contributes to the growing body of evidence supporting the integration of tactile, supportive, and woman-centered care practices within intrapartum management.

Recommendations

Future research is encouraged to replicate and extend these findings using larger and more diverse populations to improve generalizability across different clinical contexts. Randomized controlled trials would help strengthen causal conclusions and isolate the specific contribution of endorphine massage from other factors that influence pain perception. Incorporating physiological indicators, such as stress hormone levels or autonomic nervous system markers, could deepen the understanding of how tactile stimulation modulates labor pain through neuro-hormonal pathways. Studies conducted in various healthcare settings—including hospitals, birthing centers, and rural clinics—will also help assess the scalability and adaptability of the technique. In practice, maternity care providers should consider integrating endorphine massage into routine labor support and invest in structured training programs for midwives to ensure consistent and evidence-based implementation. These future directions will not only refine the intervention but also strengthen its position as a credible and accessible component of global intrapartum care standards.

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