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The Effectiveness of Combined Deep-Breathing Relaxation and Endorphin Massage in Reducing Pain and Anxiety During the Active Phase of the First Stage of Labor

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Abstract

Pain and anxiety during the active phase of the first stage of labor may increase physiological stress responses and potentially interfere with labor progress. Complementary therapies, including deep breathing relaxation and endorphin massage, have been widely used as non-pharmacological approaches to improve maternal comfort. To analyze the effectiveness of a complementary therapy combining deep breathing relaxation and endorphin massage in managing pain and anxiety during the active phase of the first stage of labor. A quasi-experimental study with a pretest-posttest control group design was conducted from January to March 2026 in the coastal area of Kendari City, Southeast Sulawesi, Indonesia. A total of 30 participants were recruited using purposive sampling and divided into an intervention group (n=15) and a control group (n=15). Pain intensity was assessed using the Numeric Rating Scale (NRS), while anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS). The intervention group demonstrated a significant reduction in pain intensity from 7.80 to 4.20 (p=0.000) and in anxiety levels from 26.5 to 18.3 (p=0.000). The mean reduction in pain (3.60 ± 0.75) and anxiety (8.20 ± 1.90) was significantly greater than that observed in the control group (p = 0.000). The combination of deep breathing relaxation and endorphin massage is an effective complementary therapy for reducing pain intensity and anxiety during the active phase of the first stage of labor and may be integrated into routine maternity care.

Introduction

Labor pain is one of the most complex forms of acute pain because it involves the interaction of physiological, psychological, social, and cultural factors. The intensity of pain experienced by each individual can vary, influenced by age, parity, previous childbirth experiences, family support, educational level, and mental preparedness for labor (Olza et al., 2020). During the active phase of the first stage of labor, increasingly strong and regular uterine contractions accompanied by progressive cervical dilation lead to an increase in pain intensity, which often triggers anxiety. The relationship between pain and anxiety is reciprocal: pain can increase anxiety, while high anxiety can intensify the perception of pain through increased activity of the sympathetic nervous system (Baagil et al., 2023). This creates a cycle that has the potential to worsen the childbirth experience and increase the risk of prolonged labor (Ginting & Barus, 2025; Yulghunlu, 2025; Vogel et al., 2024; Bingham et al., 2023).

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In recent decades, the paradigm of maternal health care has shifted from an approach focused solely on medical interventions toward care that is more centered on the needs and experiences of the patient (*woman-centered care*). This shift has spurred the growing use of complementary therapies as part of integrative maternity care (Mashayekh-Amiri et al., 2026). The World Health Organization (WHO) emphasizes the importance of providing a positive childbirth experience through the implementation of interventions that are safe, effective, and aligned with the mother's preferences. Complementary therapies have become a widely developed strategy because they can enhance comfort without causing the side effects often associated with the use of pharmacological analgesics (Kartika & Rezkiki, 2025; Niyonkuru et al., 2025; Majid et al., 2023; Romero-García et al., 2024).

Deep breathing relaxation, as *a mind-body-based* complementary therapy, works through mechanisms that regulate the autonomic nervous system by increasing parasympathetic activity and decreasing sympathetic activity (Kılıçlı & Zeyneloğlu, 2025). This helps lower heart rate, reduce muscle tension, improve tissue oxygenation, and create a calmer psychological state (Pundir et al., 2025). On the other hand, endorphin massage, as a touch-based complementary therapy, provides sensory stimulation that can activate the mechanisms of *the gate control theory* and stimulate the release of endorphins the body's natural analgesics. The combination of these two therapies is expected to produce more optimal therapeutic effects because they work through different yet complementary physiological and psychological pathways (Niyonkuru et al., 2024; Yash et al., 2023; Nazarova et al., 2022).

Although complementary therapies have been widely adopted in various countries as part of maternity care, their implementation in Indonesia remains suboptimal and tends to be limited to specific practices (Sayuti & Atikah, 2023). In the coastal areas of Kendari City, the use of complementary therapies in childbirth care remains relatively low, even though the local community has a cultural affinity for traditional health approaches (Hadi et al., 2026; Anjarsari et al., 2024). This situation indicates an opportunity to integrate evidence-based complementary therapies into midwifery care to improve the quality of care and the childbirth experience. Furthermore, research on the combination of deep breathing relaxation and endorphin massage among coastal communities remains very limited; therefore, stronger scientific evidence is needed to support the implementation of these interventions in daily clinical practice.

Methods

This study employed *a quasi-experimental* design using *a pretest-posttest control group* approach to analyze the effectiveness of a complementary therapy combining deep breathing relaxation and endorphin massage in managing pain and anxiety during the active phase of the first stage of labor (Choenarom & Samputtanon, 2025). The study was conducted at several midwife private practices (PMB) and health care facilities in the coastal area of Kendari City, Southeast Sulawesi, from January to March 2026.

The study population consisted of all mothers in the active phase of the first stage of labor during the study period, totaling 68 participants (Colak & Can, 2021). The sample comprised 30 participants selected using *purposive sampling*, consisting of 15 participants in the intervention group and 15 in the control group (Raharjo & Wahyudi, 2025). Inclusion criteria included singleton pregnancy, cephalic presentation, cervical dilation of 4–8 cm, normal maternal and fetal conditions, and willingness to participate in the study. Participants with obstetric complications or those using pharmacological analgesics were excluded from the study (Alsaeed & Elmaghraby, 2021).

The intervention group received complementary therapy consisting of deep breathing relaxation during contractions, followed by an endorphin massage on the back for approximately 20 minutes, administered by a trained midwife (Fitrianingsih & Meiliani Yulis,

2025). The control group received standard labor care. Pain intensity was measured using *the Numeric Rating Scale (NRS)* and anxiety levels using *the Hamilton Anxiety Rating Scale (HARS)* before and after the intervention. Data were analyzed using *paired t-tests* and *independent t-tests* with a significance level of $p < 0.05$ (Okoye & Hosseini, 2024).

Result and Discussion

This study involved 30 participants, consisting of 15 participants in the intervention group and 15 participants in the control group. Analysis was conducted to describe the participants' characteristics and to evaluate the effectiveness of the complementary therapy combining deep breathing relaxation and endorphin massage on changes in pain intensity and anxiety levels during the active phase of the first stage of labor. The study results are presented in the following tables.

Table 1. Respondent Characteristics

Characteristics	Intervention (n=15)	Control (n=15)
Age (years), Mean ± SD	26.4 ± 4.2	25.9 ± 3.8
Primigravida, n (%)	9 (60.0)	8 (53.3)
Multigravida, n (%)	6 (40.0)	7 (46.7)
Education ≥ high school, n (%)	10 (66.7)	9 (60.0)

Source: Primary Data, 2026

Based on Table 1, the characteristics of the respondents in both groups were relatively homogeneous. The average age of the respondents fell within the healthy reproductive age range, with nearly equal proportions of primigravidas, multigravidas, and educational levels between the intervention and control groups.

Table 2. Pain Intensity Before and After the Intervention

Group	Pre-test (Mean ± SD)	Posttest (Mean ± SD)	p-value
Intervention	7.80 ± 0.86	4.20 ± 1.01	0.000
Control	7.60 ± 0.91	6.90 ± 0.83	0.072

Source: Primary Data, 2026

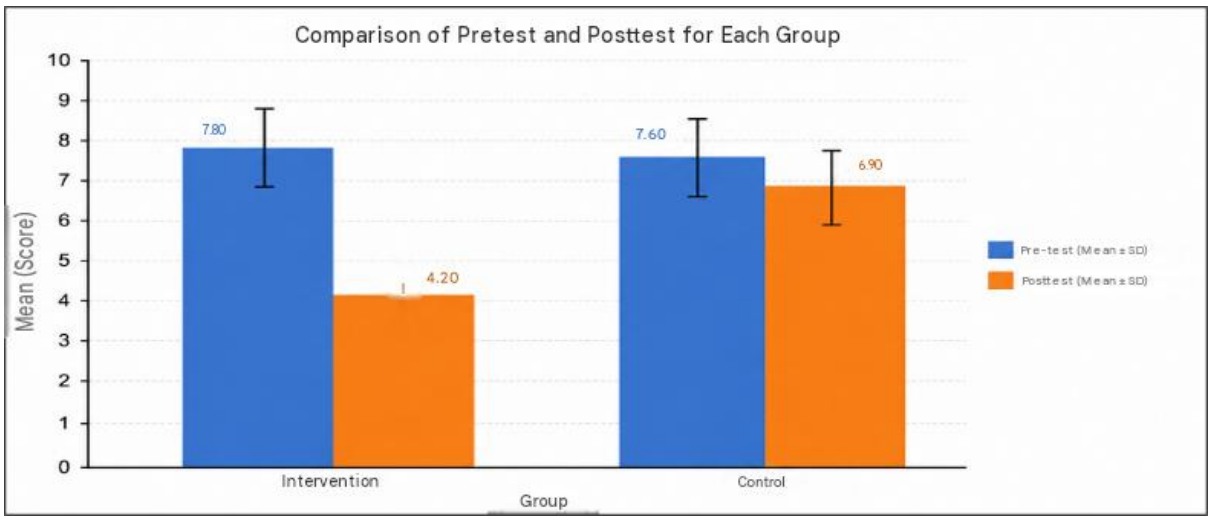

Figure 1. Comparison of Pretest and Posttest Results for Each Group

Table 2 and Figure 1 above show that the intervention group experienced a significant decrease in average pain intensity after receiving complementary therapy ($p<0.05$). In contrast, the control group did not show any statistically significant changes.

Table 3. Anxiety Levels Before and After the Intervention

Group	Pre-test (Mean ± SD)	Posttest (Mean ± SD)	p-value
Intervention	26.5 ± 3.2	18.3 ± 2.9	0.000
Control	25.9 ± 3.5	24.8 ± 3.1	0.081

Source: Primary Data, 2026

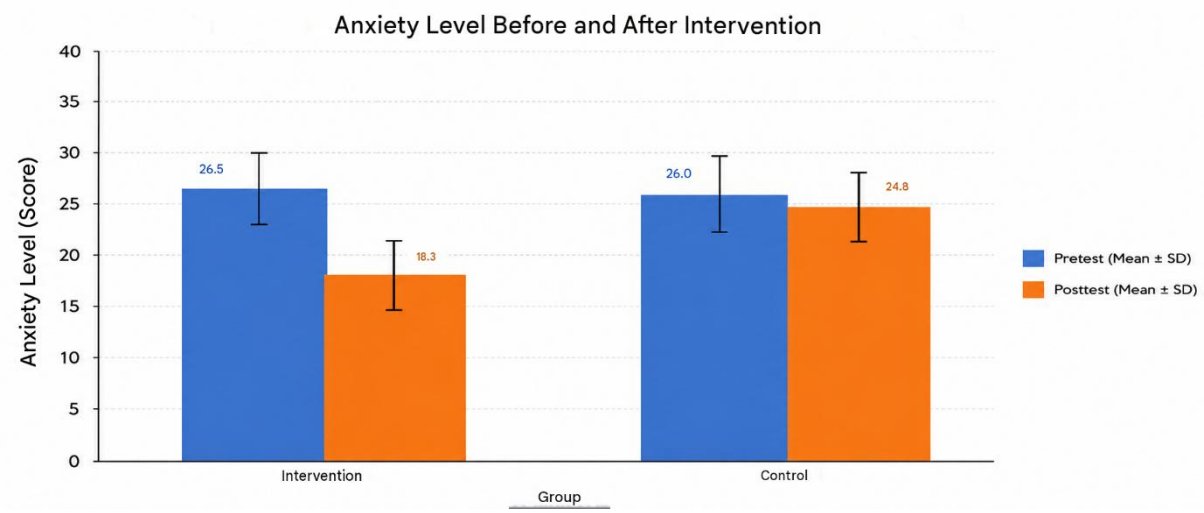

Figure 2. Diagram of Anxiety Levels Before and After the Intervention

Table 3 and Figure 2 above show that there was a significant decrease in anxiety levels in the intervention group after receiving complementary therapy combining deep breathing relaxation and endorphin massage ($p<0.05$). In the control group, the decrease in anxiety did not show a significant difference.

Table 4. Differences in Pain and Anxiety Reduction Between Groups

Variable	Intervention (Δ Mean ± SD)	Control (Δ Mean ± SD)	p-value
Pain Reduction	3.60 ± 0.75	0.70 ± 0.65	0.000
Reduction in Anxiety	8.20 ± 1.90	1.10 ± 1.40	0.000

Source: Primary Data, 2026

Table 4 shows that the reduction in pain intensity and anxiety levels in the intervention group was greater than in the control group. Statistical test results indicate a significant difference between the two groups ($p<0.05$), suggesting that the combined complementary therapy of deep breathing relaxation and endorphin massage is more effective than standard care in managing pain and anxiety during the active phase of the first stage of labor.

The study results show that the combined complementary therapy of deep breathing relaxation and endorphin massage is effective in reducing pain intensity and anxiety levels during the active phase of the first stage of labor. The significant reduction observed in the intervention group compared to the control group indicates that this complementary therapy approach can provide simultaneous physiological and psychological benefits (Bicego et al., 2021). These findings reinforce the view that pain and anxiety management can be achieved not only through pharmacological approaches but also through holistic interventions that focus on balancing the body's and mind's responses (Radmehr et al., 2025).

The reduction in pain intensity that occurs following complementary therapy can be explained by physiological mechanisms involving the central and peripheral nervous systems. Deep breathing relaxation, as *a mind-body-based* complementary therapy, helps activate the parasympathetic nervous system, thereby reducing muscle tension, improving tissue

oxygenation, and reducing the stress response during labor (Shi & Wu, 2023; Lima-De-La-Iglesia et al., 2024; Utami et al., 2026). The state of relaxation created allows the mother to better control her perception of uterine contractions. At the same time, endorphin massage a touch-based complementary therapy provides sensory stimulation that can inhibit the transmission of pain impulses through the *gate control theory* mechanism. Additionally, the tactile stimulation provided during massage increases the release of endorphins, which act as the body's natural analgesics. The combination of these two mechanisms produces a synergistic effect in reducing pain perception during the labor process (Hu et al., 2025).

The findings of this study align with the concept of integrative maternity care, which incorporates complementary therapies as part of efforts to enhance comfort and foster positive experiences during childbirth (Fregnani et al., 2025; Nori et al., 2023; Zuarez-Easton et al., 2023). This approach emphasizes that the experience of pain is influenced not only by physiological factors but also by an individual's emotional and psychological state. Therefore, interventions capable of addressing both physical and emotional aspects simultaneously will yield more optimal results compared to interventions that focus on only one aspect (Avola et al., 2025; Reynolds 3rd et al., 2022).

In addition to reducing pain, this study also demonstrated a significant reduction in anxiety levels in the intervention group. Anxiety during labor is a common emotional response resulting from uncertainty about the labor process, fear of pain, and concerns about the safety of both the mother and the baby. Uncontrolled anxiety can increase the production of stress hormones such as adrenaline and catecholamines, which have the potential to worsen pain perception and hinder labor progress. In this study, complementary therapy provided a relaxing effect that helped create a sense of calm, improved self-control, and reduced psychological tension during labor (Kesehatan et al., 2025; Astuti & Mutoharoh, 2025).

The effectiveness of complementary therapies in reducing anxiety demonstrates that a holistic approach plays a crucial role in supporting maternal mental health (Murhar & Singh, 2025). Deep breathing relaxation helps mothers focus their attention on their breathing patterns, thereby shifting their focus away from the fear and pain they are experiencing. Meanwhile, endorphin massage provides a soothing effect through therapeutic touch that can enhance a sense of safety and emotional support. The interaction between physiological relaxation and psychological comfort contributes to a more significant reduction in anxiety (Liu et al., 2025).

In the context of the coastal areas of Kendari City, the results of this study have important implications for the development of midwifery services based on complementary therapies. Coastal communities still face various limitations, both in terms of access to health services and the availability of optimal pharmacological interventions. Therefore, complementary therapy can serve as a suitable alternative because it is relatively safe, easy to implement, requires no special equipment, and is cost-effective (Caballero-Gallardo et al., 2025). Furthermore, the complementary therapy approach is more readily accepted by the community as it aligns with local culture, which has long embraced touch-based and relaxation-based care practices.

The results of this study reinforce the evidence that integrating complementary therapies into maternity care can improve the quality of midwifery care (Munné-Barellas et al., 2026). This approach is not only focused on the clinical success of childbirth but also on enhancing positive experiences and the mother's overall well-being. Thus, the combined complementary therapy of deep breathing relaxation and endorphin massage has the potential to become one of the recommended interventions in evidence-based midwifery practice, particularly in healthcare facilities with limited resources.

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Conclusion

The results of the study show that a complementary therapy combining deep breathing relaxation and endorphin massage is effective in reducing pain intensity and anxiety levels during the active phase of the first stage of labor. In the intervention group, the average pain intensity decreased from 7.80 to 4.20 (p=0.000), while the average anxiety level decreased from 26.5 to 18.3 (p=0.000). These reductions were significantly greater than those in the control group, which showed no significant changes. These findings confirm that the combined complementary therapy of deep breathing relaxation and endorphin massage can provide simultaneous physiological and psychological benefits in the management of pain and anxiety. Therefore, this intervention can be recommended as a safe, effective, and easy-to-implement nonpharmacological approach that has the potential to be integrated into obstetric care to improve the quality of the childbirth experience.

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