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The Effect of Endorphin Massage on Reducing Anxiety Levels During the First Stage of Labor

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Abstract:
Anxiety in mothers entering the latent phase of the first stage of labor can arise due to various factors, including psychological conditions, lack of family support, fear of the birthing process, limited information, and physical complaints experienced during labor. One non-pharmacological approach that has the potential to help reduce anxiety is endorphin massage, a massage technique believed to stimulate the release of endorphins, which are natural stress reducers. This study aims to assess the effectiveness of endorphin massage in reducing anxiety levels in pregnant women. The research design used a quantitative descriptive method with a one-group pretest–posttest approach. A total of 25 mothers in the first stage of labor at TPMB Diah Ulul in Probolinggo City were included in the sample. Anxiety levels were measured using the Hamilton Anxiety Rating Scale (HARS) before and after the intervention. Univariate analysis was used to describe the distribution of results, while differences in anxiety scores were tested using the t-test. The results showed a statistically significant decrease in anxiety after endorphin massage ($t = 19.5$; $p < 0.001$), with the average HARS score decreasing from 29.9 to 13.9. These findings indicate that endorphin massage is an effective non-pharmacological intervention and can be recommended as a supportive measure to help reduce anxiety in laboring mothers, thereby potentially improving comfort and the quality of the birthing experience.

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INTRODUCTION

Childbirth represents a profound physiological and psychological transition in a woman's life, ideally experienced as a natural process that prioritizes maternal and neonatal well-being with minimal medical intervention (Young et al., 2025). Safe childbirth emphasizes holistic support, encompassing physical comfort, emotional reassurance, and sensory engagement, to foster a positive birthing experience and optimize outcomes for both mother and infant (Leinweber & Stramrood, 2024). The first stage of labor, characterized by progressive cervical dilation, is conventionally divided into the latent phase (0–4 cm dilation) and the active phase (4–10 cm dilation), each demanding careful clinical observation to ensure physiological progression while safeguarding maternal comfort (Agrawal et al., 2023). Within this context, effective non-pharmacological support strategies have gained recognition for their capacity to enhance the physiological birth process, reduce unnecessary interventions, and promote maternal satisfaction, cornerstones of contemporary woman-centered maternity care (Mrayan et al., 2024).

Labor pain during the first stage arises primarily from uterine contractions, cervical distension, and stretching of the lower uterine segment, which stimulate nociceptive pathways via the sacral

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plexus and provoke referred pain in the lower back (Swengel & McConville, 2025; Ismarina et al., 2023). This physiological pain response activates the sympathetic nervous system, elevating maternal heart rate and blood pressure and increasing catecholamine release. When unmitigated, such physiological stress responses may disrupt uterine contractility, leading to dystocia, prolonged labor, and increased risk of fetal distress (Melaku, 2022). Critically, the experience of labor pain is highly individualized, influenced by psychosocial factors, cultural background, parity, and personal pain tolerance (Navarro-Prado et al., 2022). Consequently, unmanaged pain not only compromises maternal comfort but may also initiate a cascade of physiological and psychological responses that adversely affect labor progression and maternal well-being (Tandon et al., 2025).

Anxiety frequently accompanies the labor process, manifesting as apprehension, fear, and a sense of helplessness that can significantly impair a woman's coping capacity (Sari et al., 2022). During the first stage of labor, anxiety may be precipitated by intense pain, fear of the unknown, inadequate social support, limited understanding of labor physiology, or previous traumatic birth experiences (Sutcliffe et al., 2023; Abidin et al., 2022). Elevated anxiety levels potentiate the stress response, further increasing catecholamine secretion, which may inhibit uterine activity and prolong labor (Melaku, 2022). Moreover, maternal anxiety has been associated with adverse outcomes, including heightened perception of pain, increased requests for pharmacological analgesia, operative delivery, and postpartum psychological sequelae. Given these implications, the identification and implementation of accessible, evidence-based interventions to mitigate anxiety during early labor represent a critical priority in promoting physiological birth and maternal mental health (Poehlmann et al., 2022; Titisari & Putri, 2025).

Non-pharmacological interventions offer a safe, accessible, and culturally adaptable approach to managing labor-related distress without the risks associated with pharmacological agents (Nori et al., 2022). Among these, endorphin massage has emerged as a promising technique that combines tactile stimulation with neurohormonal modulation (Azissah et al., 2024). This intervention involves systematic, rhythmic massage applied to the lower back and sacral region during contractions, stimulating mechanoreceptors that trigger endogenous endorphin release (Alviatussyamsiah et al., 2024). Endorphins, endogenous opioid peptides, act on central receptors to modulate pain perception and induce feelings of calm and well-being (Dewanti et al., 2024). Preliminary evidence suggests that endorphin massage not only attenuates labor pain intensity but also promotes parasympathetic activation, potentially reducing anxiety and enhancing the woman's sense of control. However, while pain reduction has been documented, the specific anxiolytic effect of endorphin massage during the first stage of labor remains underexplored in controlled settings (Dahlan et al., 2023).

This study aims to evaluate the effect of endorphin massage on anxiety levels among women in the first stage of labor, utilizing the Hamilton Anxiety Rating Scale (HARS) as a validated quantitative measure. Conducted within independent midwifery practices in the Kanigaran area of Probolinggo City, Indonesia, this research addresses a significant gap in the literature by isolating anxiety, not merely pain, as the primary outcome of interest. Using a quantitative quasi-experimental design, the study seeks to generate robust evidence on the efficacy of endorphin massage as a low-cost, non-invasive intervention to support maternal psychological well-being during labor (Sartika & Noorlinda, 2025). Findings may inform the integration of structured massage protocols into routine intrapartum care, particularly in resource-limited settings where pharmacological options are constrained, ultimately contributing to safer, more humane, and woman-centered childbirth experiences.

METHOD

This study employed a descriptive quantitative approach with a one-group pretest–posttest design to evaluate changes in anxiety levels among mothers in the first stage of labor. The population comprised all mothers in labor in the Kanigaran area of Probolinggo City, and the study was conducted at the Independent Midwife Practice (TPMB) Diah Ulul. The research took place from August 1 to October 30, 2025. A total of 25 respondents were selected using a purposive sampling technique based on inclusion criteria, namely, mothers in the first stage of labor who experienced mild to severe anxiety and agreed to participate in the study.

The intervention provided was an endorphin massage, a non-pharmacological technique aimed at reducing anxiety and increasing comfort during labor. The instrument used to measure anxiety levels was the Hamilton Anxiety Rating Scale (HARS), which had undergone local adaptation for laboring mothers. Validity and reliability testing conducted prior to data collection confirmed that the instrument was appropriate, with a Cronbach's alpha value of 0.85.

Data collection was conducted using the HARS questionnaire administered before and after the intervention. The data were processed and analyzed using SPSS version 29. Normality testing was performed to assess the distributions of pretest and posttest scores, followed by a paired t-test to assess the significance of differences in anxiety levels, with a significance level set at $p < 0.05$. The interpretation of results focused on the magnitude of anxiety reduction following the intervention. This study received ethical approval from the Health Research Ethics Committee of the Midwifery Faculty of Health Science at dr. Soepraoen and all respondents provided informed consent prior to participation. Confidentiality and anonymity were ensured throughout the research process.

RESULT

The effect of endorphin massage on reducing anxiety levels during the first stage of labor in mothers giving birth. The characteristics of the respondents who were mothers giving birth at TPMB Diah Ulul in Probolinggo City are presented below.

Table 1. Sociodemographic Characteristics of Respondents (n = 25)

Variable	Category	n	%
Age (years)	< 20	1	4.0
	21–35	24	96.0
	> 35	0	0.0
Education	Junior high school	0	0.0
	High school	18	72.0
	Bachelor's degree	7	28.0
Occupation	Housewife/Homemaker	15	60.0
	Private sector employee	8	32.0
	Entrepreneur	2	8.0

Based on Table 1, the majority of respondents at TPMB Diah Ulul, Probolinggo City, were aged 21–35 years (96%), with only a small proportion aged under 20 years (4%) and nonaged 35 years or older. This distribution indicates that most respondents were within the reproductive age range generally considered optimal for pregnancy and childbirth.

Regarding educational background, most respondents had completed high school (72%), while 28% held a bachelor's degree. No respondents had a junior high school education or lower, suggesting a relatively adequate educational profile among the study participants.

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Regarding occupation, more than half of the respondents were housewives or homemakers (60%), followed by private sector employees (32%) and entrepreneurs (8%). This indicates that the respondent population was predominantly not formally employed outside the household, which may have implications for socioeconomic status and access to health-related information and services.

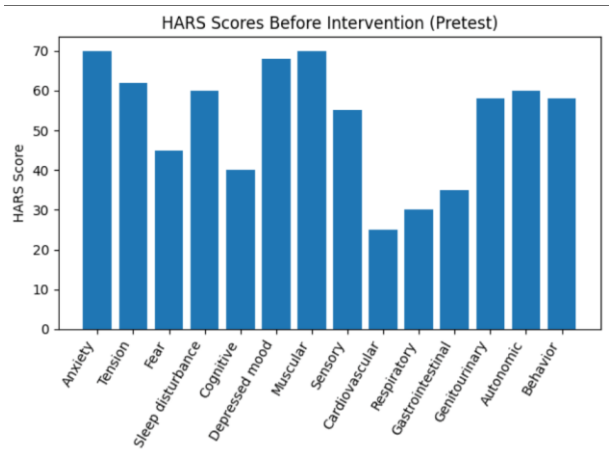

Figure 1. HARS Scale Before Intervention

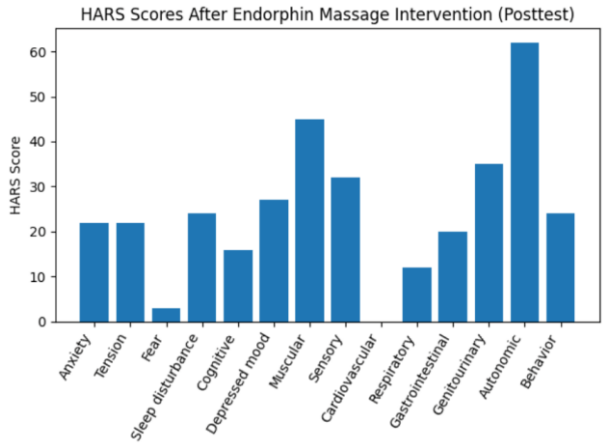

Figure 2. HARS Scale After Intervention

Based on Figures 1 and 2, anxiety levels can be measured using the Hamilton Anxiety Rating Scale (HARS), which contains 14 characteristics. The HARS scale covers assessments of various aspects, such as anxiety, tension, fear, sleep disturbances, decreased concentration, feelings of depression, and somatic symptoms. In addition, this scale assesses complaints related to the cardiovascular, respiratory, digestive, and urogenital systems, as well as autonomic symptoms and behavioral responses during the interview.

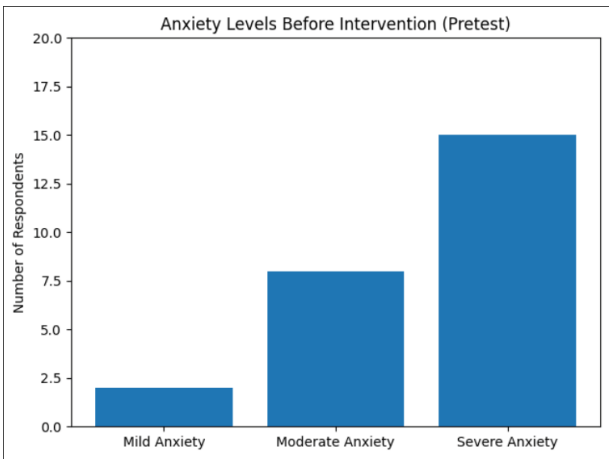

Figure 3. HARS Scale Before Intervention

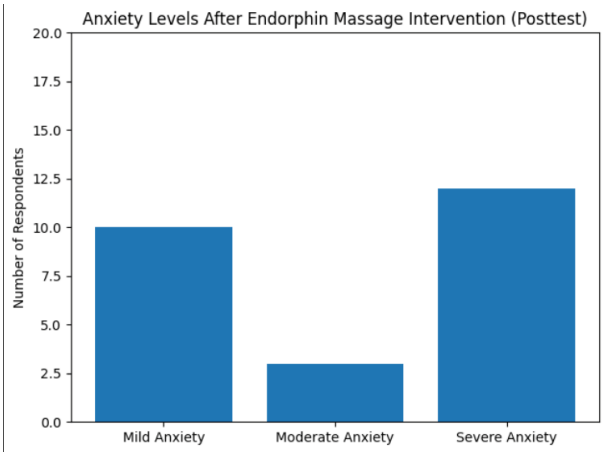

Figure 4. HARS Scale After Intervention

Based on Figures 3 and 4, the anxiety level calculated using the Hars scale shows that of the 25 respondents, 15 respondents showed a high level of anxiety (60%), while 8 respondents were in the moderate anxiety category (32%), and only 2 respondents experienced mild anxiety (8%).

Table 3. Anxiety Levels Before and After Endorphin Massage (n=25)

		Mean	N	Std. Deviation	Std. Error Mean
Anxiety Level	Pretest	29.9	25	5.2	1.5
	Posttest	13.9	25	3.6	0.72

Table 3 presents the descriptive statistics of anxiety levels before and after the endorphin massage intervention. The mean anxiety score before the intervention was 29.9 (SD = 5.2), which decreased to 13.9 (SD = 3.6) after the intervention, indicating a substantial reduction in anxiety levels.

Table 4. Results of Comparative Analysis between Pretest and Posttest Anxiety Levels

Comparison	Mean Difference	SD	t	df	p (one-tailed)	p (two-tailed)
Pretest – Posttest	15.9	4.0	19.5	24	< 0.001	< 0.001

As shown in Table 4, the paired comparison between pretest and posttest anxiety scores revealed a statistically significant reduction in anxiety following the endorphin massage intervention, $t(24) = 19.5$, $p < .001$. This result indicates that endorphin massage was associated with a significant decrease in anxiety levels among pregnant women.

DISCUSSION

This study employed the Hamilton Anxiety Rating Scale (HARS) to assess anxiety levels among 25 women in the first stage of labor and demonstrated that endorphin massage exerted a significant anxiolytic effect, resulting in a marked shift in anxiety distribution. Prior to the intervention, 60% of participants experienced severe anxiety. Following the application of endorphin massage, this distribution changed substantially, with 48% of mothers reporting no anxiety. This finding is clinically meaningful, as anxiety during the latent phase of labor is known to activate the hypothalamic–pituitary–adrenal axis, leading to increased secretion of stress hormones and dysregulated prostaglandin release. These physiological responses not only intensify the subjective perception of pain but may also contribute to dysfunctional labor patterns.

The substantial reduction in anxiety observed after endorphin massage suggests that this non-pharmacological intervention may disrupt the anxiety–pain cycle by promoting endogenous opioid release and enhancing parasympathetic nervous system activity. This mechanism supports a more physiologically favorable environment for labor progression while simultaneously improving maternal psychological well-being (Hu et al., 2025).

Endorphin massage reduces anxiety and stress through complex neurophysiological and hormonal pathways. Tactile stimulation during massage activates the parasympathetic nervous system, promoting relaxation and suppressing sympathetic nervous system activity associated with stress responses (Kartika et al., 2025). In addition, endorphin massage stimulates the release of endorphins, endogenous opioids that not only provide analgesic effects but also regulate emotional responses by modulating amygdala activity, the brain region responsible for emotional processing. Reduced amygdala activation contributes to a calmer emotional state and diminished stress reactivity (Sartika et al., 2024).

Statistical analysis confirmed a significant decrease in anxiety following endorphin massage, with mean HARS scores declining from 29.9 before intervention to 13.9 after intervention ($p < 0.001$). Although the intervention demonstrated a strong therapeutic effect, individual responses to endorphin massage may vary. Factors such as parity, pain tolerance, cultural background, and

previous childbirth experiences may influence its effectiveness. Moreover, contextual factors, including the quality of provider support, the physical environment of the birthing setting, and the presence of continuous companionship, may further modulate responsiveness to tactile interventions. These considerations underscore the importance of a personalized, woman-centered approach when applying endorphin massage during labor (Dewanti et al., 2024).

As a non-pharmacological intervention, endorphin massage offers significant advantages in managing anxiety among laboring women. Its analgesic and relaxation effects not only alleviate anxiety but may also enhance the overall childbirth experience. By promoting the release of serotonin and dopamine while reducing norepinephrine levels, endorphin massage helps establish optimal physiological conditions for a smoother and more positive labor process (Azissah et al., 2024). Future research should focus on determining the optimal duration and frequency of endorphin massage and identifying moderating factors that influence its effectiveness.

Despite its promising findings, this study has several limitations. The relatively small sample size (n = 25) and the absence of a control group limit the generalizability of the results and restrict causal inference. Future studies should employ larger samples and controlled experimental designs to strengthen evidence regarding the effectiveness of endorphin massage. Nonetheless, the present findings have important practical implications for midwifery practice, as endorphin massage can be integrated into routine labor care as a safe and effective non-pharmacological intervention (Elgzar et al., 2024). Supportive maternal health policies that promote midwifery training and facility-based implementation of endorphin massage may further contribute to improving maternal mental health outcomes.

CONCLUSION

Based on the findings of this study, it can be concluded that endorphin massage is effective in reducing anxiety levels among mothers during the first stage of labor. As a non-pharmacological intervention, endorphin massage represents a safe, simple, and feasible method for anxiety management during childbirth. Integrating endorphin massage into intrapartum care has the potential to enhance the childbirth experience by providing emotional support and reducing maternal anxiety. Further research is recommended to explore the underlying mechanisms of its effects and to evaluate its efficacy across different populations and clinical settings. The adoption of endorphin massage as a standard non-pharmacological intervention in labor and delivery units is therefore strongly encouraged.

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CONFLICT OF INTEREST

The authors declare no conflict of interest related to the conduct, findings, or publication of this study.

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