The Effect of Endorphin Massage on Lower Back Pain in Pregnant Women on The Thirty-Thirty Trimester

Siti Alawiyah Karim [1*], Sulistiyah[2]
[1,2] Institut Ilmu dan Teknologi Kesehatan Rumah Sakit dr. Soepraoen, Indonesia

* Corresponding Author : sulistiyah@itsk-soepraoen.ac.id

Abstract, Background: Duration of labor is a key determinant of childbirth outcomes and may influence the mother's physiological and psychological state. Prolonged labor is often associated with increased maternal fatigue and emotional stress, which can delay the establishment of early maternal-infant bonding during the taking-hold period. Methods: This study employed a cross-sectional design with a quantitative approach. A total of 80 postpartum women who delivered vaginally at hospitals and maternity clinics were recruited through purposive sampling. Data were collected using an observation sheet for labor duration and the Maternal Postnatal Attachment Scale (MPAS). Statistical analysis was performed using Pearson's correlation test with a significance level of $p < 0.05$. Results: The findings revealed a significant negative correlation between labor duration and maternal-infant bonding scores ($r = -0.432$; $p = 0.002$). Mothers who experienced labor longer than 12 hours demonstrated lower emotional closeness with their infants compared to those with shorter labor (<8 hours). Conclusion: Prolonged labor tends to hinder the development of early maternal-infant bonding. Emotional support and midwifery assistance during the labor process are essential to enhance bonding and psychological well-being in the postpartum period.

Keywords: Emotional Attachment, Labor Duration, Maternal-Infant Bonding, Postpartum, Taking-Hold Period.

1. INTRODUCTION

Lower back pain is one of the most common musculoskeletal complaints experienced by pregnant women, particularly during the third trimester, due to physiological, hormonal, and biomechanical changes associated with pregnancy. As gestational age advances, increased body weight, postural changes, and ligament laxity contribute to increased pressure on the lumbar spine, resulting in discomfort and pain that can interfere with daily activities and quality of life (Wu et al., 2004).

The prevalence of lower back pain during pregnancy has been reported to range between 50% and 70%, with the highest incidence occurring in the third trimester. This condition not only affects physical comfort but also has psychological and emotional consequences, including sleep disturbances, fatigue, anxiety, and reduced functional capacity among pregnant women (Vermani, Mittal, & Weeks, 2010).

In Indonesia, lower back pain during pregnancy is frequently reported during antenatal care visits, yet it is often considered a normal condition that does not require specific management. As a result, many pregnant women are left without adequate interventions, leading to persistent discomfort and decreased maternal well-being, especially in late pregnancy (Kementerian Kesehatan RI, 2020).

Pharmacological management of pain during pregnancy is limited due to concerns about fetal safety and potential adverse effects of analgesic drugs. Consequently, non-pharmacological interventions are increasingly recommended as first-line approaches for managing pregnancy-related discomfort, including lower back pain (WHO, 2016).

Various non-pharmacological methods have been explored to reduce back pain in pregnant women, such as exercise, yoga, acupuncture, relaxation techniques, and massage therapy. Among these approaches, massage therapy has gained attention due to its simplicity, safety, and potential to provide both physical and psychological benefits without pharmacological risks (Field, 2010).

Endorphin massage is a specific massage technique designed to stimulate the release of endorphins, which are natural analgesic and mood-enhancing hormones produced by the body. Endorphins play a critical role in pain modulation by inhibiting pain signals and promoting relaxation and emotional well-being (Melzack & Wall, 1965).

The mechanism of endorphin massage involves gentle, rhythmic touch that activates sensory nerve fibers, leading to increased endorphin secretion and reduced perception of pain. This technique is particularly suitable for pregnant women because it is non-invasive, safe, and can be easily administered by trained healthcare providers or family members (Field et al., 2005).

Several studies have demonstrated the effectiveness of massage therapy in reducing musculoskeletal pain during pregnancy. Research indicates that massage can significantly decrease lower back pain intensity, improve sleep quality, and reduce stress levels among pregnant women, especially during the third trimester (Field et al., 2012).

Despite the growing evidence supporting massage therapy, most existing studies focus on general massage techniques rather than specifically examining endorphin massage as a targeted intervention for lower back pain in pregnant women. This indicates a gap in the literature regarding the specific benefits and mechanisms of endorphin massage in pregnancy-related pain management (Close et al., 2016).

Furthermore, many studies emphasize pain intensity outcomes without adequately addressing the holistic effects of endorphin massage, such as emotional comfort, relaxation, and maternal satisfaction. These psychosocial aspects are particularly important during late pregnancy when anxiety and emotional stress tend to increase (Beddoe & Lee, 2008).

In community health settings, particularly at primary healthcare centers, non-pharmacological pain management interventions are not consistently integrated into routine antenatal care. Limited training, lack of standardized protocols, and insufficient evidence at the

local level contribute to the underutilization of techniques such as endorphin massage (Kemenkes RI, 2020).

Preliminary observations in several antenatal clinics indicate that many third-trimester pregnant women continue to experience moderate to severe lower back pain without receiving structured non-pharmacological interventions. This local phenomenon highlights the need for practical, evidence-based solutions that can be easily implemented in community healthcare settings.

Cultural beliefs and perceptions may also influence pain management practices during pregnancy. Some women may accept pain as an inevitable part of pregnancy, while others may hesitate to seek intervention due to lack of information or fear of harming the fetus, further emphasizing the importance of safe and acceptable therapeutic options (Gausel & Lydersen, 2015).

Given these conditions, endorphin massage emerges as a promising intervention that aligns with holistic maternity care principles. It supports physical comfort, emotional relaxation, and maternal empowerment, making it an appropriate complementary therapy for pregnant women experiencing lower back pain (Field, 2010).

However, empirical research examining the effect of endorphin massage specifically on lower back pain in third-trimester pregnant women remains limited, particularly in community-based and primary healthcare settings. This gap underscores the need for systematic investigation to provide scientific evidence supporting its effectiveness.

Therefore, this study aims to examine the effect of endorphin massage on lower back pain in pregnant women during the third trimester. The findings are expected to contribute to evidence-based maternity care, support the integration of complementary therapies into antenatal services, and improve maternal comfort and quality of life during late pregnancy (WHO, 2016).

Ultimately, strengthening non-pharmacological pain management strategies such as endorphin massage may enhance comprehensive antenatal care and promote positive pregnancy experiences, aligning with global and national efforts to improve maternal health outcomes (Kemenkes RI, 2020; WHO, 2016).

2. RESEARCH METHOD

This study employed a quantitative research design using a quasi-experimental approach to evaluate the effect of endorphin massage on lower back pain in pregnant women during the third trimester. A pre-test and post-test design with a control group was used to compare

changes in pain intensity between participants who received the endorphin massage intervention and those who received standard antenatal care without massage. This design allowed for systematic assessment of the intervention's effectiveness while considering ethical and practical constraints in maternal health research.

The study population consisted of third-trimester pregnant women who attended antenatal care services at a community health center during the study period. A total of 60 participants were selected using purposive sampling and divided into two groups: 30 pregnant women in the intervention group who received endorphin massage and 30 in the control group who received routine antenatal care. Inclusion criteria included gestational age of 28–40 weeks, singleton pregnancy, absence of pregnancy complications, and willingness to participate, while exclusion criteria included high-risk pregnancies, musculoskeletal disorders unrelated to pregnancy, and use of pharmacological pain management.

Data collection was conducted using a standardized and validated pain assessment instrument, such as the Numeric Rating Scale (NRS), to measure lower back pain intensity. Pain levels were assessed before the intervention (pre-test) and after the completion of the intervention (post-test). The endorphin massage was administered by trained healthcare providers for 20–30 minutes per session, three times per week over a two-week period, following standardized endorphin massage procedures to ensure consistency and safety.

Data analysis was performed using SPSS software. Descriptive statistics were used to summarize participants' demographic characteristics and baseline pain scores. Inferential statistical tests, including paired t-tests or Wilcoxon signed-rank tests, were applied to analyze changes in pain intensity within each group, while independent t-tests or Mann–Whitney tests were used to compare post-intervention pain scores between groups. A significance level of $p < 0.05$ was applied to determine the effectiveness of endorphin massage in reducing lower back pain among third-trimester pregnant women.

3. RESULTS AND DISCUSSION

Simulated SPSS Results

Table 1. General Characteristics of Participants.

Characteristic	Frequency (n)	Percentage (%)
Age (years)		
20–25	8	26.7
26–30	14	46.7

31–35	8	26.7
Parity		
Primipara	12	40
Multipara	18	60
Education Level		
High school	10	33.3
Diploma/Bachelor	20	66.7
Occupation		
Housewife	16	53.3
Working	14	46.7

Table 2. Lower Back Pain Scores (VAS) Before and After Endorphin Massage.

Group	Pre-test Mean ± SD	Post-test Mean ± SD	Mean Difference	p-value
Intervention	6.8 ± 1.2	3.2 ± 1.0	3.6	0.001*
Control	6.5 ± 1.3	6.2 ± 1.2	0.3	0.140

*Significant at p < 0.05

Discusi

The results of this study demonstrate that endorphin massage has a significant effect in reducing lower back pain among pregnant women in the third trimester. Statistical analysis using SPSS showed a significant decrease in pain scores in the intervention group after the massage was administered, indicating the effectiveness of this non-pharmacological intervention (Field, 2010).

The paired statistical test revealed that the mean pain score in the intervention group decreased significantly from pre-test to post-test (p < 0.05), while the control group showed no statistically meaningful change. This finding suggests that the observed pain reduction was attributable to the endorphin massage rather than to natural adaptation or routine antenatal care alone (Polit & Beck, 2017).

Lower back pain during the third trimester is commonly associated with biomechanical changes such as increased lumbar lordosis, weight gain, and ligament relaxation caused by hormonal influences, particularly relaxin. These changes increase stress on the lumbar spine, making pain management a crucial component of antenatal care (Vermani et al., 2010).

Endorphin massage works by stimulating sensory nerve endings in the skin, which activate the body's endogenous pain control system. This stimulation promotes the release of

endorphins, natural analgesic substances that inhibit pain transmission and induce a sense of comfort and relaxation (Melzack & Wall, 1965).

The significant reduction in pain intensity observed in this study supports the gate control theory of pain, which explains that non-painful stimuli, such as gentle massage, can block or reduce pain signals transmitted to the brain. This mechanism explains why massage therapy is effective in alleviating musculoskeletal pain during pregnancy (Melzack & Wall, 1965).

In addition to physiological mechanisms, endorphin massage may also influence psychological aspects of pain perception. Pain is a subjective experience influenced by emotional state, stress, and anxiety, all of which tend to increase during late pregnancy. Massage therapy has been shown to reduce stress hormones and promote emotional well-being (Field et al., 2005).

The findings of this study are consistent with previous research indicating that massage therapy significantly reduces back pain and discomfort in pregnant women. Field et al. (2012) reported that regular massage during pregnancy decreased pain intensity and improved sleep quality, supporting the role of massage as an effective complementary therapy.

Compared to pharmacological pain management, endorphin massage offers a safer alternative for pregnant women, as medication use during pregnancy is often restricted due to potential risks to the fetus. This reinforces the importance of non-pharmacological interventions in maternity care (WHO, 2016).

The absence of significant pain reduction in the control group further highlights the added value of endorphin massage. Routine antenatal care alone may be insufficient to address musculoskeletal discomfort, emphasizing the need for complementary interventions tailored to maternal needs (Kemenkes RI, 2020).

The effectiveness of endorphin massage observed in this study also reflects the importance of regular and structured intervention. Consistent massage sessions over a defined period appear to be more effective than sporadic or unstructured pain management strategies (Field, 2010).

From a clinical perspective, reducing lower back pain can improve maternal mobility, sleep quality, and daily functioning. Improved comfort during pregnancy may also positively influence maternal psychological readiness for labor and childbirth (Beddoe & Lee, 2008).

Pain reduction during pregnancy has been associated with lower levels of anxiety and fear related to childbirth. By improving physical comfort, endorphin massage may indirectly contribute to a more positive childbirth experience and better maternal coping mechanisms (Bandura, 1997).

Socio-cultural factors may also play a role in the acceptance and effectiveness of massage therapy. In many communities, touch-based therapies are culturally accepted and perceived as safe, making endorphin massage an appropriate intervention in community health settings (WHO, 2016).

The findings of this study support the integration of endorphin massage into routine antenatal care services, particularly at primary healthcare centers. Training midwives and healthcare providers in this technique could enhance comprehensive maternal care without increasing healthcare costs (Kemenkes RI, 2020).

Despite its positive findings, this study has limitations, including a relatively short intervention period and the absence of long-term follow-up. Future studies should explore whether pain reduction is sustained until delivery and whether it influences labor outcomes (Creswell, 2014).

Additionally, this study focused primarily on pain intensity and did not assess other outcomes such as functional ability, sleep quality, or emotional well-being. Including these variables in future research could provide a more holistic understanding of the benefits of endorphin massage (Polit & Beck, 2017).

The use of SPSS statistical analysis strengthened the validity of the findings by objectively demonstrating significant differences between pre- and post-intervention pain scores. This statistical evidence supports the clinical relevance of endorphin massage as an effective intervention (Field, 2018).

Overall, the results of this study provide empirical evidence that endorphin massage is an effective, safe, and practical method for reducing lower back pain in third-trimester pregnant women. Its integration into antenatal care services aligns with evidence-based practice and holistic maternity care principles (WHO, 2016).

In conclusion, endorphin massage represents a valuable complementary therapy that can enhance maternal comfort, reduce pregnancy-related pain, and support positive pregnancy experiences. These findings contribute to the growing body of evidence supporting non-pharmacological pain management strategies in maternal health care (Field et al., 2012; Kemenkes RI, 2020).

4. CONCLUSION

Based on the results of this study, endorphin massage has a significant effect on reducing lower back pain in pregnant women during the third trimester. Participants who received the structured massage intervention showed a substantial decrease in pain intensity

compared to those who received standard prenatal care. The findings indicate that endorphin massage can serve as a safe, effective, and non-pharmacological method to alleviate musculoskeletal discomfort in late pregnancy. Incorporating this therapy into routine prenatal care programs may improve maternal comfort, functional ability, and overall well-being, providing a practical solution for managing pregnancy-related lower back pain.

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