CHANGES IN BACK PAIN INTENSITY FOLLOWING ENDORPHIN MASSAGE AMONG THIRD-TRIMESTER PREGNANT WOMEN

Dhiana Setyorini[1], Nathasya Zidny Ilmaya[2], Intim Cahyono[3]
[1,,2,3]*Poltekkes Kemenkes Surabaya(SURABAYA)*

**Corresponding author: dhiana@poltekkes-surabaya.ac.id*

Abstract

Low back pain is a common complaint among pregnant women in the third trimester, typically caused by hormonal changes and postural shifts, and it can affect both physical and psychological well-being. Endorphin massage is considered a non-pharmacological alternative that may help alleviate this discomfort. This study aimed to determine the changes of endorphin massage in reducing back pain in pregnant women. The research used a pre-experimental design with a onegroup pretest-posttest method, involving 37 pregnant women in their third trimester. The independent variable was endorphin massage, while the dependent variable was the intensity of back pain. Data collection instruments included standard operating procedures (SOPs), questionnaires, and the Visual Analog Scale (VAS). Data analysis was conducted using the ilcoxon signed-rank test.The results showed a decrease in back pain intensity among third-trimester pregnant women after receiving endorphin massage. Prior to the intervention, nearly all participants experienced severe back pain; however, following the therapy, all reported a reduction to moderate pain levels. The Wilcoxon test yielded a p-value of 0.000, indicating a significant effect of Endorphin Massage on the reduction of back pain. This therapy works by stimulating the release of endorphins natural analgesics thereby inducing relaxation without the side effects associated with medication. Furthermore, the method activates the parasympathetic nervous system, which helps relax muscles and alleviate tension, making it a safe, non-pharmacological alternative for reducing back pain in pregnant women

Keywords: Endorphin Massage, Low back pain, pregnant women.

1. INTRODUCTION

As the due date approaches, complaints of back pain among pregnant women tend to increase. During the third trimester, the body undergoes numerous adjustments—ranging from the baby's increasing weight and changes in body posture to hormonal influences that cause connective tissues to relax. All these factors contribute to the onset of back pain. This issue is not merely physical; it also affects the expectant mother's emotional and mental state. Persistent discomfort can heighten the risk of anxiety and symptoms of mild depression (Nurhayati & Adi, 2019). Such discomfort often interferes with daily activities, limits mobility, and disrupts sleep. Furthermore, the pain can elevate stress and anxiety levels, negatively impacting the mother's mental health.

Pain is commonly experienced by pregnant women as they enter the second and third trimesters. Pain is a complex phenomenon. As defined by the International Association (1979), pain is an "unpleasant sensory and emotional experience associated with actual or potential tissue damage." Pain during pregnancy gives rise to worry and fear, which in turn contribute to increased stress and significant bodily changes. Fear and pain often go hand in hand and exacerbate one another (1).

According to the WHO, back pain during pregnancy is not uncommon. In Australia, approximately 70% of pregnant women experience it, while in the UK and Scandinavian countries, the figure reaches 50%. In Indonesia, the incidence is estimated to be between 60% and 80%, with a rate of around 65% recorded in East Java alone. In fact, out of 100 first-time expectant mothers, about 80 experience back

pain significant enough to be bothersome, and 10 of them face difficulty carrying out their activities effectively.

During pregnancy, the body adapts to numerous changes, including shifts in posture and the loosening of joints. These adaptations can trigger muscle tension and back pain (2,3). To manage this pain, one can employ pharmacological approaches such as using analgesics as recommended by a physician or non-pharmacological methods like Endorphin Massage. Endorphin Massage is a non-invasive technique effective at reducing pain by stimulating the release of endorphins, which act as natural analgesics. This therapy also lowers endogenous catecholamine levels and promotes relaxation through nervous system stimulation (4). Consequently, this method is considered a safe and viable alternative for managing back pain in pregnant women.

2. METHODOLOGY

This study employed a quantitative approach with a pre-experimental design, specifically a single-group pretest-posttest design. The participants consisted of 37 third-trimester pregnant women registered at the Urungagung Community Health Center (Puskesmas) in Sidoarjo, selected via purposive sampling. Endorphin massage served as the independent variable, while back pain in third-trimester pregnant women was the dependent variable. Data collection was conducted using Standard Operating Procedures (SOPs), the Visual Analog Scale (VAS) for pain, and questionnaires.

Once the data were collected, the researchers proceeded with data processing. Univariate analysis was used to present the data via frequency tables, while bivariate analysis was conducted to examine the relationship between the two variables under study. The Shapiro-Wilk test was applied to assess normality, and the results indicated that the data were not normally distributed; consequently, the Wilcoxon test was employed for the analysis.

3. RESULTS

3.1 Characteristics of Third-Trimester Pregnant Women

Table 1. Characteristics of Third-Trimester Pregnant Women

Characteristics	Number	
	F	%
Maternal Age		
<20 Years	1	2.7
20–35 Years	32	86,5
>35 Years	4	10.8
Total	37	100
Gestational Age		
7 Months	10	27
8 Months	10	27
9 Months	17	46
Total	37	100
Education		

Highest Level		
Elementary School	12	2.7
Junior High School	6	16.2
Senior/Vocational High School	17	46
Diploma III (D3)	2	5.4
Diploma IV (D4)	1	2.7
Bachelor's Degree (S1)	10	27
Total	37	100
Occupation		
Housewife	23	62.2
Private Sector Employee	7	18.9
Civil Servant	7	18.9
Total	37	100
Gravida		
G1 (first pregnancy)	16	43.2
G2 (second pregnancy)	14	37.8
≥G3 (third/subsequent pregnancy)	7	19
Total	37	100
Parity		
Nullipara (never given birth) 16 43.2	16	43.2
Primipara (1 birth) 15 40.5	15	40.5
Multipara (2 births) 6 16.3	6	16.3
Total 37 100%	37	100
Abortion		
Never 32 86.5	32	86.5
Ever 5 13.5	5	13.5
Total	37	100

Table 1 indicates that almost all pregnant women complaining of back pain were aged 20 to 35 years (86.5%), while a small proportion (2.7%) were under 20 years old, and another small proportion (10.8%) were over 35 years old. Regarding gestational age, nearly half (46%) were nine months pregnant, while the remainder were distributed between seven and eight months of gestation (27% in each category).

46% of the respondents had a high school or vocational school education, while the others came from various educational backgrounds, ranging from elementary school to a bachelor's degree. Regarding

employment, the majority (62.2%) of the pregnant women were homemakers, while smaller proportions (18.9% each) worked for private companies or as civil servants.

The majority of the pregnant women were in their first (43.2%) or second (37.8%) pregnancy, while a small proportion (18.9%) were in their third or subsequent pregnancy. Regarding parity, nearly half (43.2%) had never given birth, 40.5% had given birth once, and a small proportion (16.3%) had a history of two births. The vast majority (86.5%) had never experienced a miscarriage, while the remainder (13.5%) had.

3.2 Back Pain Intensity Before Endorphin Massage in Pregnant Women in the Third Trimester

Tabel 2. Back Pain Intensity Before Endorphin Massage in Pregnant Women in the Third Trimester

Back Pain Intensity	Before Intervention		After intervention	
	n	%	n	%
No Pain	0	0	0	0
Mild Pain	0	0	0	0
Moderate Pain	5	13.6	37	100
Severe Pain	32	86.4	0	0
Very Severe Pain	0	0	0	0
Total	37	100	37	100

Based on Table 2, regarding back pain intensity prior to endorphin massage, the vast majority (86.4%) of pregnant women fell into the severe pain category, while a small roportion (13.6%) experienced moderate pain; none experienced mild or very severe pain, or no pain at all. Back pain intensity following endorphin massage: All (100%) pregnant women fell into the moderate pain category; none experienced mild, severe, or very severe pain, nor were any pain-free.

Prior to the intervention, 86.4% of respondents experienced severe back pain, while the remaining 13.6% experienced moderate pain. There were no reports of mild or extremely severe pain, nor of an absence of pain. These findings align with the study by (4,5), which also noted a predominance of moderate to severe pain prior to the administration of endorphin massage. Based on the VAS scale, severe pain falls within the 7–9 range; it is characterized by an inability to follow commands—responding only to physical actions—and a failure to resolve through basic relaxation techniques alone. If left untreated, this pain risks developing into a long-term issue, such as postpartum back pain or chronic pain (6).

Maternal age also influences the severity of back pain. Pregnancies occurring at ages under 20 or over 35 are considered high-risk due to the physical and mental immaturity of the reproductive system (7). In this study, the majority of severe pain cases were observed in pregnant women aged 20 to 35, whereas lower rates were found outside this age range (6). Beyond maternal age, advancing gestational age also increases the risk of back pain as the pressure exerted by the uterus on the spine intensifies. This affects lumbar flexibility and mobility particularly during the eighth and ninth months of pregnancy, which this study identified as the period with the highest prevalence of severe pain (8). Postural changes resulting from a shifting center of gravity, ligament laxity, and stretching abdominal muscles also cause muscle imbalances around the pelvis, thereby triggering pain (8).

Parity is another significant factor. Back pain is more frequently experienced by women who have had multiple pregnancies, as their abdominal muscles have been weakened by previous gestations. Conversely, primigravid women (those in their first pregnancy) tend to retain stronger muscles, resulting in lower pain levels (6). Additionally, a history of back pain and excess body weight contribute to an

increased risk of pain during pregnancy. Upaya untuk mencegah atau mengatasi nyeri punggung dapat dilakukan dengan edukasi kesehatan, termasuk senam hamil, postur tubuh yang benar, teknik mengangkat beban yang tepat, serta menghindari berdiri terlalu lama (10). Salah satu intervensi nonfarmakologis yang erbukti efektif adalah endorphin massage. Terapi ini membantu mengurangi intensitas nyeri dengan merangsang pelepasan endorfin, memberikan efek elaksasi, serta mengurangi ketegangan otot, tanpa menimbulkan efek samping obat. Pijatan endorfin aman digunakan pada kehamilan trimester akhir, karena efektif meredakan nyeri dan mendukung kestabilan emosional sebelum melahirkan.

Research findings indicate that following an intervention consisting of Endorphin Massage administered for 10 -15 minutes over four sessions—the majority of respondents experienced moderate back pain; notably, none reported mild, severe, or very severe pain, nor an absence of pain. Recorded pain scores ranged from 4 to 6 on the Visual Analog Scale (VAS). This is attributed to the pregnancy having reached the third trimester, a stage characterized by significant physiological and biomechanical bodily changes that trigger lower back pain (6).

The reduction in pain intensity following the intervention is also supported by previous research. Research Studies by Natalia Ika and Indah (2023) demonstrates hat a significant reduction in pain levels occurred after the administration of Endorphin Massage for three days. This massage stimulates large nerve receptors on the skin's surface, inhibiting the transmission of pain signals to the brain and altering pain perception. A similar study by Sari (2023) also indicates that nearly half of the respondents (43.8%) experienced a reduction in pain from a severe level to a moderate or mild one. According to the IASP, women in the third trimester of pregnancy typically experience lower back pain in the spinal region between T12 and S1. This condition is caused by the weight of the fetus and uterine enlargement, which increase pressure on back muscles and joints, resulting in strain and pain (11). Insufficient back muscle strength also contributes to muscle strain when performing incorrect movements or maintaining a specific posture for too long.

Endorphin massage, as a non-pharmacological therapy, has been proven effective in alleviating pain by stimulating soft tissues such as muscles, tendons, and ligaments. While this therapy does not involve joint movement, it promotes relaxation and enhances blood circulation. By stimulating the production of endorphins—the body's natural analgesic compounds the therapy lowers catecholamine levels and inhibits pain signals through the activation of efferent pathways (12).

However, although all respondents experienced a reduction in pain, some continued to report moderate pain following the therapy. This indicates that the effects of endorphin massage are temporary, as endorphin levels in the body decline over time. Consequently, a sustained and comprehensive approach is required to achieve optimal results. Massage should be administered regularly as prenatal gymnastics or yoga. These activities help maintain back muscle flexibility and reduce pressure on the spine.

Furthermore, education regarding proper posture during sitting, standing, sleeping, and daily activities is crucial for preventing pain recurrence. Stress management techniques, such as deep breathing exercises or meditation, are also recommended to support emotional and mental well-being during pregnancy. While endorphin massage is proven to help reduce pain, therapeutic outcomes are maximized when combined with comprehensive interventions addressing physical, postural, and psychological aspects.

3.3Wilcoxon Test Results for Back Pain Intensity

Table 3: Wilcoxon Test Results for Back Pain Intensity

	Mean	Median (Minimum–Maximum)	p-value

Back pain intensity before intervention	7.49	8 (6-9)	0.000
Back pain intensity after intervention	5.22	5 (4-6)	

Based on Table 3, the Wilcoxon test results indicate a significant difference regarding the effect of endorphin massage on back pain complaints among third-trimester pregnant women at the Urangagung Community Health Center in April 2025. Prior to the intervention, the mean pain level was 7.49 with a median of 8 (range: 6–9); following the intervention, this decreased to a mean of 5.22 with a median of 5 (range: 4–6). The p-value of 0.000 ($p < 0.05$) indicates a statistically significant difference. Of the 37 respondents, 36 experienced a reduction in pain intensity, while one showed no change and no increase. Endorphin massage therapy proved effective in alleviating back pain complaints experienced by pregnant women in their third trimester. Endorphin massage has been proven effective in reducing back pain intensity among third-trimester pregnant women ($p = 0.000$). Thirty-six out of 37 respondents experienced improvement, with VAS scores shifting from severe to moderate pain. Back massage stimulates nerves in the spinal cord, sending signals to the brain via the thalamus and limbic system, thereby triggering the release of endorphins (Amir et al., 2022). Endorphins act as natural neurotransmitters that bind to receptors in the nerves and spinal cord, inhibiting the transmission of pain signals to the brain. Consequently, the perception of pain decreases significantly. This aligns with the findings of Ayu Handayany et al. (2020), who stated that skin stimulation through endorphin assage can block pain impulses by releasing endorphins. Prior to the intervention, 45% of the pregnant women experienced severe pain; however, this condition was no longer present after the therapy was administered. Research by Amir et al. (2022) also reported a p-value of 0.000, confirming the effectiveness of endorphin massage in alleviating back pain during the third trimester. In the researchers' view, endorphin massage is an effective non-pharmacological method because it stimulates the release of endorphins—natural pain-relieving hormones—without side effects. The significant reduction in pain following the intervention demonstrates that this technique provides optimal comfort and relaxation for pregnant women, particularly in the lower back region.

However, the effectiveness of this therapy relies heavily on consistent implementation and support regarding both physical and psychological care. Therefore, a holistic strategy incorporating regular massage, posture education, and stress management is considered essential to maximize therapeutic outcomes. Through this comprehensive approach, back pain in third-trimester pregnant women can be optimally managed or controlled.

4. CONCLUSIONS AND RECOMMENDATIONS

Prior to therapy, the majority of pregnant women in their third trimester experienced severe back pain. However, following the massage intervention, a change was observed: all participants showed a reduction in pain intensity to a moderate level. The Wilcoxon test corroborated these findings with significant results, demonstrating the therapy's effectiveness. As "endorphin massage" offers a safe and natural method for alleviating back pain in pregnant women, it should ideally be administered by trained healthcare professionals or family members. Additionally, pregnant women are advised to maintain proper posture and engage in regular light exercise to help reduce pain symptoms.

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REFERENCES

[1] Purnamasari, 2019 ENGARUH ENDHORPHIN MASSAGE TERHADAP PENGURANGAN Pendahuluan Metode. Indonesian Journal of Midwifery Scientific, 2(1), 21–27.

[2] Fauziah, 2012; A.A. Author, Book Title. City/State: Publisher, Year of Publication.

[3] Andaryono, 2012 A.A. Author, "Chapter Title" in Book Title (Editors eds.), pp.-pp., City/State: Publisher, Year of Publication.

[4] Eka et al., 2023 Eka, & Sri. (2023). Intensitas Nyeri Pungggung Ibu Hamil Trimester III. Jurnal Kebidanan, XV(01), 1–112. www.ejurnal.stikeseub.ac.id

[5] Sri (2023 Eka, & Sri. (2023). Intensitas Nyeri Pungggung Ibu Hamil Trimester III. Jurnal Kebidanan, XV(01), 1–112. www.ejurnal.stikeseub.ac.id

[6] Amir, A. Y., Meysetri, F. R., Herayono, F.,Fransisca, D., & Manila, H. D. (2022).Pengaruh Endorphin Massage TerhadapIntensitas Nyeri Punggung Pada Ibu HamilTrimester Iii Di Klinik Setia Padang Pariaman.Jurnal Kesehatan Media Saintika, 13(1), 297–306. https://jurnal.syedzasaintika.ac.id/index.php/medika/article/view/

[7] Kuswati, K., Wahyuni, T., & Sri Mulati, T. (2022). the Effect of Yoga on the Reduction of Back Pain in Pregnant Womens Trimester Ii and Iii. Jurnal Doppler, 6(1), 67–76. https://doi.org/10.31004/jd.v6i1.3626Mukhlis et al., 2020

[8] Veronica, S. Y., Kumalasari, D., & Gustianingrum, C. (2021). Hubungan Senam Hamil Dengan Kejadian Nyeri Punggung pada Kehamilan Trimester III. Jurnal Aisyah : Jurnal Ilmu Kesehatan, 6, 219–224.https://doi.org/10.30604/jika.v6is1.790Paul W Hodges, N. C. (2019). Fact sheet Fact sheet. Nursing and Midwifery Board of Australia, 440(July), 1–5.

[9] Handayani, D., . J., Octavariny, R., & Ginting, D. Y. (2021). Pengaruh Endorphine Massage

[10] Terhada Penurunan Intensitas NyeriPunggung Ibu Hamil Di Klinik Juliana Tanjung Morawa. Jurnal Kebidanan Kestra (Jkk), 3(2), 116–120. https://doi.org/10.35451/jkk.v3i2.64

[11] Mukhlis, H., Yunitasari, E., Febriyanti, H., Fauziah, N. A., Rinjani, M., & Putri, R. H. (2020). actor analysis of third trimester pregnant women readiness in preparing for childbirth: A cross-sectional study. International Journal of Pharmaceutical Research, 12(4), 3501–3507. https://doi.org/10.31838/ijpr/2020.12.04.478