

Back Massage in Reducing Anxiety and Back Pain in Third Trimester Pregnant Women

Masase Punggung terhadap Kecemasan dan Nyeri pada Ibu Hamil Trimester Ketiga

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Abstract

Anxiety is a common problem among pregnant women, especially during the third trimester. Maternal anxiety refers to the experience of excessive and distressing worry, fear, and anxiety related to childbirth, concerns about the well-being of the developing fetus, and the challenges of parenthood. Lower back pain can reduce a pregnant woman's quality of life. Back massage is an intervention that can be offered to pregnant women in the third trimester to relieve anxiety and back pain. The aim of this study was to analyze the effect of back massage on anxiety and back pain in pregnant women in the third trimester. This quantitative research used a quasi-experimental approach with a pretest-posttest design for one group of 30 subjects, using consecutive sampling as the sampling technique. The research was conducted from July to December 2025 in the Mulyorejo Community Health Center Working Area, Deli Serdang Regency. The data collected were primary data, derived from guided interviews using a questionnaire. This study used the Perinatal Anxiety Screening Scale to assess maternal anxiety and the Numeric Rating Scale to assess back pain. Data were analyzed using IBM SPSS Stats 22 software using the Wilcoxon test with a 95% confidence level (p -value < 0.05). The study results showed a decrease in anxiety from 16.60 to 10.87, and a decrease in pain from 2.10 to 0.47, with p -value = 0.0001 for both outcomes. It can be concluded that back massage reduces anxiety and pain in pregnant women in the third trimester.

Keywords: anxiety, back massage, pain, pregnant women

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Abstrak

Kecemasan merupakan masalah umum di kalangan ibu hamil, terutama pada trimester ketiga. Kecemasan ibu hamil mengacu pada pengalaman ibu hamil yang mengalami kekhawatiran, ketakutan, dan kecemasan yang berlebihan dan menyusahkan berkaitan dengan persalinan, kekhawatiran tentang kesejahteraan janin yang sedang berkembang, dan tantangan menjadi orang tua. Nyeri punggung bawah dapat menurunkan kualitas hidup ibu hamil. Masase punggung merupakan intervensi yang dapat ditawarkan kepada ibu hamil pada trimester ketiga untuk mengatasi kecemasan dan nyeri punggung. Tujuan penelitian ini adalah untuk menganalisis pengaruh masase punggung terhadap kecemasan dan nyeri punggung pada ibu hamil trimester ketiga. Penelitian kuantitatif ini menggunakan pendekatan kuasi-eksperimental dengan desain pretest-posttest satu kelompok berjumlah 30 responden, menggunakan consecutive sampling dalam teknik pengambilan sampel. Penelitian ini dilakukan dari Juli hingga Desember 2025 di Wilayah Kerja Puskesmas Mulyorejo, Kabupaten Deli Serdang. Data yang dikumpulkan adalah data primer, yang diperoleh dari wawancara terarah menggunakan kuesioner. Penelitian ini menggunakan Skala Skrining Kecemasan Perinatal untuk menilai kecemasan ibu hamil dan Skala Peringkat Numerik untuk menilai nyeri punggung. Data dianalisis menggunakan perangkat lunak IBM SPSS Stats 22 dengan uji Wilcoxon pada tingkat kepercayaan 95% ($p\text{-value} < 0,05$). Hasil studi menunjukkan kecemasan menurun dari skor 16,60 menjadi 10,87, dan nyeri menurun dari skor 2,10 menjadi 0,47 dengan $p\text{-value} = 0,0001$ untuk kedua hasil tersebut. Dapat disimpulkan bahwa masase punggung mengurangi kecemasan dan nyeri ibu hamil trimester ketiga.

Kata Kunci: ibu hamil, kecemasan, masase punggung, nyeri

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Highlight:

- Back massage therapy serves as a highly effective non-pharmacological intervention to reduce both maternal anxiety levels and lower back pain intensity in third-trimester pregnant women.
- The application of back massage techniques effectively alleviates maternal anxiety responses while simultaneously relieving musculoskeletal discomfort ahead of childbirth.
- The initial positive correlation between anxiety and back pain disappears following the intervention, indicating that back massage independently modulates each clinical outcome.

INTRODUCTION

Maternal anxiety during pregnancy refers to the pregnant woman's experience of excessive and distressing worry, fear, and anxiety. Increased anxiety is associated with childbirth, concerns about the well-being of the developing fetus, and the challenges of parenthood (Nabwire et al., 2024).

A systematic review of maternal anxiety in Africa showed a prevalence of 29 percent (Desalegn et al., 2025). Systematic reviews and meta-analyses show that 1 in 5 pregnant women in low- and middle-income countries experience anxiety disorders

during pregnancy (Mitchell et al., 2023). A previous study in one of the working areas of a Community Health Center in Surabaya, Indonesia showed that around 56.7 percent of pregnant women in the first trimester and 70.7 percent of pregnant women in the second trimester did not experience anxiety, while around 51.7 percent of pregnant women in the third trimester experienced mild to moderate anxiety (Rachma et al., 2024). Anxiety is a common disorder among pregnant women and occurs more frequently during the third trimester (Alnasheet et al., 2024).

Perinatal anxiety is normal, but it can become a significant problem and negatively impact a pregnant woman's behavior, if not properly managed. If this condition persists, it can be harmful to both the mother and the developing fetus (Wallace and Araj, 2020; Callanan et al., 2022).

Women in the third trimester of pregnancy who reported higher anxiety symptoms experienced higher rates of back pain (Virgara et al., 2018). Lower back pain is a common and significant musculoskeletal problem that occurs during pregnancy (Manyozo, 2019). Previous studies have shown that 75.3% of pregnant women experience back pain during pregnancy. Pregnant women experience lower back pain in the third trimester (85.5%) and in the lumbar region (45.5%). Factors associated with lower back pain include income status, trimester, weight gain during pregnancy, frequent urinary tract infections, stooped posture, having experienced lower back pain during a previous pregnancy, and a history of lower back pain. The prevalence of lower back pain during pregnancy is quite high, and lower back pain slightly limits women's daily activities (Berber and Satılmış, 2020). Back pain affects the daily functions of pregnant women such as sleeping and normal work that pregnant women usually do (Chang et al., 2026). High back pain in pregnant women will have a significant impact on reducing their quality of life (Djawas et al., 2023).

The first line of treatment for anxiety in pregnant women is non-pharmacological treatment, also known as complementary therapy. This can be used for pregnant women with mild to moderate anxiety. If the anxiety has reached several levels, pharmacological therapy is the appropriate first-line option. Pharmacological therapy carries greater risks and benefits, so each decision regarding pharmacological therapy needs to be tailored to the individual pregnant women after a thorough discussion of the risks and benefits (Kaye and Kaye, 2025). Systematic reviews and meta-analyses showed that non-pharmacological therapies significantly reduce the risk of anxiety symptoms in both healthy and high-risk pregnancies (Zeng et al., 2025; Zhou et al., 2025; Değirmenci et al., 2025). A systematic review of the impact of interventions on anxiety reduction during pregnancy found 11 studies, including 9 studies with an effect and 2 studies with no effect. The nine studies with an effect included the use of relaxation ($p = 0,001$), music therapy (3 studies, 2 studies with $p = 0,001$ and 1 study with $p = 0,01$), behavioral activation ($p = 0,014$), massage ($p = 0,01$), yoga vs social support group ($p = 0,001$), group CBT ($p = 0,016$), and yoga therapy plus telephone counseling ($p = 0,001$). The systematic review also confirmed that cognitive behavioral therapy, massage, yoga and music therapy were the most effective interventions for reducing anxiety in pregnancy (Domínguez-Solís et al., 2021).

Treatment for low back pain emphasizes non-pharmacological or complementary therapies such as individual physical therapy, water aerobics, acupuncture, and massage therapy. Although some medications are safe and well-tolerated, they can have unexpected consequences for pregnant women. Therefore, if a pregnant woman uses medication to relieve pain, this requires a thorough discussion with an obstetrician-gynecologist (Eapen and Cifu, 2021). A meta-analysis of randomized controlled trials

showed that non pharmacological interventions are effective for managing pregnancy-related low back pain (Wang et al., 2025). Systematic review showed that there were 11 studies on reducing anxiety and pain in pregnant women, where 7 studies showed a significant impact including 2 studies on aromatherapy with inhalation $p = 0.002$ and $p = 0.001$, 1 study on massage $p = 0.001$, 1 study on breathing techniques $p = 0.001$, 2 studies on music therapy $p = 0.001$ and $p < 0.05$, 1 study on aromatherapy $p < 0.05$. Systematic reviews confirmed that the most frequently used non-pharmacological techniques to reduce anxiety and pain in pregnant women about to give birth are aromatherapy, hydrotherapy, music therapy, breathing techniques, and massage (Nascimento et al., 2022).

One non-pharmacologic or complementary therapy that can significantly reduce pain and anxiety ($p < 0.001$) is massage therapy. Massage therapy can function as a safe, cost-effective, and beneficial non-pharmacologic alternative to reduce pain intensity and improve emotional well-being (Putri et al., 2024). Systematic review and meta-analysis used eight studies, of which five studies assessed massage therapy on anxiety in pregnant women and found a moderate effect of the intervention (Hall et al., 2020). Previous studies have shown a significant difference before and after back massage therapy in reducing lower back pain in pregnant women in the third trimester (Aswitami et al., 2022; Puspitasari and Indrianingrum, 2021).

A systematic review showed that lavender essential oil has calming and relaxing properties, using 251 articles, 3 articles with 413 participants were found who used lavender essential oil during the second and third trimesters of pregnancy to measure anxiety, and showed significant results with a $p\text{-value} < 0.05$ and no side effects (Vidal-García et al., 2024).

A preliminary survey of healthcare workers at the Mulyorejo Community Health Center (Puskesmas) revealed that five pregnant women in their third trimester experienced anxiety and lower back pain. This study aimed to analyze the effect of back massage on anxiety and back pain in pregnant women in their third trimester.

METHODS

This study was a quantitative study with a quasi-experimental approach using a one-group pretest-posttest design regarding back massage for pregnant women in the third trimester. The sample size was 30 subjects. The sample determination was based on the consideration of the minimum sample size for intervention research which was 30 subjects, and Roscoe stated that for experimental research, 15 to 30 subjects are required per group, and the limited number of populations that can be reached (Sugiyono, 2020; Sansesa et al., 2026).

The sampling technique was consecutive sampling, with the inclusion criteria being pregnant women in their third trimester without pregnancy complications and willing to participate, while the exclusion criteria were pregnant women in their third trimester who had pregnancy complications. The study was conducted from July to December 2025 in the Mulyorejo Community Health Center working area, Deli Serdang Regency.

Data collection included the following steps. The researcher explained the benefits of the study to potential subjects, and those willing to participate were asked to sign a consent form. Then, the researcher collected primary data on anxiety and pain from subjects who met the criteria and were willing to participate in the study through directed interviews using a questionnaire. After that, the researcher provided

information regarding the description of pregnant women, anxiety, and back pain, followed by the definition, benefits, contraindications, equipment preparation, techniques, and procedures for back massage using a leaflet. Then, the researcher conducted a back massage intervention using four back massage techniques: effleurage, kneading, friction, and beating percussion, using lotion with lavender aromatherapy to the subjects. After the intervention was completed, anxiety and pain in the third trimester of pregnant women were measured again using the same questionnaire. This study used the Perinatal Anxiety Screening Scale, which consists of 31 questions, including four sets of questions including the first set discussing acute anxiety symptoms and adjustment of pregnant women consisting of 8 questions; the second set discussing general worries and specific fears of pregnant women consisting of 10 questions; the third set discussing perfectionism, control, and trauma of pregnant women consisting of 8 questions; and the fourth set discussing social anxiety consisting of 5 questions. This Perinatal Anxiety Screening Scale has a rating from 0 to 3, where 0 means no symptoms at all, 1 means symptoms several times, 2 means symptoms often, and 3 means symptoms almost always. This scale has a lowest score of 0 and a highest score of 93. The Perinatal Anxiety Screening Scale has been tested for validity and reliability in the Indonesian version (Yuliani *et al.*, 2024).

This study also uses pain measurement with a numerical rating scale (NRS) consisting of a pain scale ranging from 0 to 10. Pain scale 0 means no pain, pain scale 1 means very mild pain, pain scale 2 means mild pain, pain scale 3 means pain has begun to be felt, but can still be tolerated, pain scale 4 means the pain is quite disturbing, pain scale 5 means the pain is really disturbing and cannot be ignored for a long time, pain scale 6 means the pain has reached the stage of disturbing the senses, especially the sense of sight, pain scale 7 means the pain has made you unable to do activities, pain scale 8 means the pain causes you to be unable to think clearly, even changes in behavior, pain scale 9 means the pain causes you to scream and want any way to relieve the pain, and pain scale 10 means the pain is at the most severe stage and can cause you to lose consciousness. This numerical rating scale has been tested for validity and reliability (Andreyani and Bhakti, 2023). The Shapiro-Wilk test showed $p < 0.05$, indicating that the data were not normally distributed. Therefore, the analysis used a non-parametric test, the Wilcoxon test, with a 95% confidence level ($\alpha = 0.05$). The data were analyzed using IBM SPSS Stats 22 software. This research has received research ethics approval with number 01.26.2142/KEPK/Poltekkes Kemenkes Medan 2025. and received proof of completion of the research from the Mulyorejo Health Center, Deli Serdang Regency with number 000.1.2.3/672/PKM-MR/XII/2025.

RESULTS AND DISCUSSIONS

Subject characteristics

This study used 30 subjects. Table 1 describes the characteristics of the subjects. The demographic profile of the participants revealed that the majority of third-trimester pregnant women were aged 21–30 years (66.7%), with the remaining proportion (33.3%) falling within the 31–40 age bracket. Regarding educational background, a large majority of respondents had completed senior high school (70.0%), while smaller proportions had attained junior high school (10.0%), elementary school (10.0%), or college-level education (6.7%), and a small fraction reported no formal schooling (3.3%). In terms of employment, nearly all participants were housewives (96.7%), with only 3.3% working as private employees. Analysis of marriage history indicated that

most respondents married at 21–30 years of age (76.7%), followed by those married between 11 and 20 years (20.0%), and a minor portion at 31–40 years (3.3%). Finally, regarding parity, the sample was predominantly comprised of women in their second pregnancy (36.7%) and first pregnancy (33.3%), whereas those in their third and fourth pregnancies accounted for 16.7% and 13.3%, respectively.

Table 1. Subject characteristics of pregnant women without complications in the third trimester

Respondent Characteristics	F	%
Age (Years)		
21-30	20	66.7
31-40	10	33.3
Education		
No School	1	3.3
Elementary School	3	10.0
Junior High School	3	10.0
Senior High School	21	70.0
College	2	6.7
Job Type		
Housewife	29	96.7
Private employees	1	3.3
Age at Marriage (Years)		
11-20	6	20.0
21-30	23	76.7
31-40	1	3.3
Pregnancy to		
1	10	33.3
2	11	36.7
3	5	16.7
4	4	13.3

Sources: Primary data, 2025

Table 2 presents the descriptive statistics for anxiety and back pain scores among third-trimester pregnant women before and after the back massage intervention. Prior to the intervention, the mean anxiety score was 16.60 ± 10.53 (ranging from 2.00 to 47.00), which decreased to 10.87 ± 9.68 (ranging from 0.00 to 42.00) following the back massage. Similarly, the mean back pain score showed a reduction from 2.10 ± 0.92 (ranging from 1.00 to 4.00) before the intervention to 0.47 ± 0.68 (ranging from 0.00 to 2.00) post-intervention. Overall, these findings indicate a descriptive trend of declining mean scores for both anxiety and pain following the administration of back massage therapy.

Table 2. Average anxiety and pain scores before and after back massage

Sub Variables	Minimum	Maximum	Mean	Standard Deviation
Anxiety before intervention	2.00	47.00	16.60	10.53
Anxiety after intervention	0.00	42.00	10.87	9.68
Pain before intervention	1.00	4.00	2.10	0.92

Sub Variables	Minimum	Maximum	Mean	Standard Deviation
Pain after intervention	0.00	2.00	0.47	0.68

Sources: Primary data, 2025

The anxiety of pregnant women in the third trimester decreased from a score of 16.60 to 10.87, and pain decreased from a score of 2.10 to 0.47. Table 3 shows the correlation between anxiety and pain in pregnant women before and after back massage using the Spearman rho test because the data were not normally distributed.

Table 3. Correlation between anxiety and pain before and after back massage

Correlation	Correlation Coefficient	<i>p-value</i>
Anxiety and Pain Before Back Massage	0.371	0.044*
Anxiety and Pain After Back Massage	0.049	0.795

Note: *spearman's rho, significant if $p\text{-value} < 0.05$

The correlation before intervention was significant but weak, while the correlation after intervention was not significant. Table 4 shows a bivariate analysis of the effect of back massage on anxiety and pain in pregnant women in the third trimester, using the Wilcoxon test because the data were not normally distributed.

Table 4. The effect of back massage on anxiety and pain in pregnant women

Effect	Mean Difference	<i>p-value</i>
Anxiety before and after back massage	5.73	0.0001*
Pain before and after back massage	1.63	0.0001*

Note: *Wilcoxon, significant if $p\text{-value} < 0.05$

There was an effect of back massage on anxiety in pregnant women in the third trimester and there was an effect of back massage on back pain in pregnant women in the third trimester, with $p = 0.0001$ for each variable.

Researchers conducted a study on 30 pregnant women in their third trimester at the Mulyorejo Community Health Center in Deli Serdang Regency, who received back massage. Results showed that back massage significantly reduced anxiety and back pain in third-trimester pregnant women. The average anxiety score before the intervention was mild, although some subjects experienced moderate and severe anxiety. This study is similar to previous studies that showed anxiety among pregnant women, with the lowest level being severe anxiety at approximately 26 percent (Kadim et al., 2023).

The results showed a positive correlation between anxiety and pain in pregnant women before back massage intervention, with a *p-value* of 0.044 and a correlation coefficient of 0.371, indicating a weak correlation. Several studies have shown that back pain levels are higher when pregnant women report higher levels of anxiety (Virgara et al., 2018).

However, when compared with maternal anxiety and pain after the intervention, there was no relationship, with a *p-value* of 0.795 and a correlation coefficient of 0.049, which is positive and very weak. This suggests that many other factors are related to maternal pain, including income, weight gain, frequency of UTI, hunched posture, previous experience of lower back pain (Berber and Satılmış, 2020).

The results showed a change in the mean anxiety score before and after the

intervention, from a mean score of 16.60 before the intervention to 10.87 after the intervention, with a mean difference of 5.73. The results also showed a *p-value* of 0.0001, indicating a significant effect of back massage on anxiety in third-trimester pregnant women.

Massage stimulates sensory nerves in the skin, muscles, tendons, and underlying ligaments, releasing the neurotransmitters oxytocin, dopamine, and serotonin. These neurotransmitters are associated with positive mood and social connection. This is followed by a reduction in the stress hormone cortisol and its precursor adrenocorticotrophic hormone (ACTH). This then leads to increased vagus nerve activity, which activates the parasympathetic nervous system, resulting in increased relaxation and well-being, experiences of comfort, contentment, health, and happiness. Therefore, massage is considered to have anti-anxiety effects (Salvo, 2021),

Massage is the systematic touch and manipulation of the body's soft tissues and is increasingly used as an adjunct therapy to relieve stress and promote relaxation and well-being during pregnancy. Massage has been shown to benefit pregnant women, including those struggling with anxiety (Shetty and Fogarty, 2021).

This study used lavender oil for massage with aromatherapy. Previous studies have shown that using lavender can reduce anxiety (Kim et al., 2021; Sayed et al., 2020). A systematic review showed that lavender essential oil has calming and relaxing properties, using 251 articles, 3 articles with 413 participants were found who used lavender essential oil during the second and third trimesters of pregnancy to measure anxiety, and showed significant results with a *p-value* < 0.05 and no side effects (Vidal-García et al., 2024).

Previous studies on the effect of prenatal massage on the level of anxiety facing childbirth in third trimester primigravida mothers at PMB Nopi Utami Tangerang using the PASS questionnaire showed that before the intervention there were 10 subjects with mild anxiety, 18 subjects with moderate anxiety and 2 subjects with severe anxiety, while after the intervention there were 4 subjects with no anxiety, 24 subjects with mild anxiety, 2 subjects with moderate anxiety and none with severe anxiety. Based on the results of the Wilcoxon test, a *p-value* of 0.0001 was found, indicating a significant effect (Yovika and Tridiawati, 2023).

The results showed a change in the mean pain score before and after the intervention, from a mean score of 2.10 before the intervention to 0.47 after the intervention, with a mean difference of 1.63. The results also showed a *p-value* of 0.0001, indicating a significant effect of back massage on back pain in third-trimester pregnant women.

Massage is one of the most widely adopted therapeutic interventions worldwide for treating a variety of musculoskeletal problems, including nonspecific low back pain, providing pain relief and functional improvement in individuals with subacute and chronic low back pain (Chen et al., 2022). Touch is the method used in massage. It aims to control soft tissue, muscles, tendons, and connective tissue, resulting in increased circulation, muscle relaxation, and pain reduction. There was scientific evidence that massage therapy can relieve back pain (Cross and McWay, 2023). Previous studies have shown significant differences before and after back massage therapy in reducing lower back pain in pregnant women in the third trimester (Puspitasari and Indrianingrum, 2021).

The results of the study showed that anxiety and pain decreased significantly after the back massage intervention. Back massage during pregnancy in healthy pregnant women has been shown to reduce anxiety symptoms, reduce back pain, lower cortisol

levels, and have positive effects on immune function. Massage treatments have been shown to have more positive effects than other relaxation techniques such as progressive muscle relaxation. Pregnant women with complicated pregnancies should only receive massage after consulting with their obstetrician (Mueller and Grunwald, 2021).

This study attempted to minimize bias by using a minimal sample size and providing inclusion criteria. However, it still has limitations, including a limited sample size and the lack of a control group due to the limited scope of the study location and timeframe. Therefore, it is recommended that future research increase the sample size using a sample size formula and use a control group as a comparison.

CONCLUSIONS

The study results confirmed a reduction in anxiety and pain scores, and a significant effect on third-trimester pregnant women. Back massage can be considered a non-pharmacological or complementary intervention that supports third-trimester pregnant women in reducing anxiety and back pain. Health care providers, particularly nurses and midwives, can consider back massage interventions as part of antenatal care (ANC) services during prenatal classes.

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CONFLICT OF INTEREST

The authors declare that they have no conflict of interest

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