

EFFECTIVENESS OF AROMATHERAPY MASSAGE AND PELVIC ROCKING EXERCISE ON ANXIETY, LOWER BACK PAIN, AND SLEEP QUALITY

Efektivitas Aromatherapy Massage dan Pelvic Rocking Exercise terhadap Kecemasan, Nyeri Punggung Bawah, dan Kualitas Tidur

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ABSTRAK

Keluhan yang paling sering muncul pada trimester akhir kehamilan adalah rasa cemas, nyeri pinggang bawah, dan sulit tidur sehingga mengganggu rutinitas sehari-hari. Metode nonfarmakologi berupa pijat aromaterapi dan latihan goyang panggul merupakan metode yang membantu mengurangi rasa cemas, nyeri pinggang bawah dan mengatasi sulit tidur pada ibu hamil trimester ketiga. Penelitian ini merupakan penelitian quasi eksperimen dengan rancangan pretest and posttest controlled group design. Teknik pengambilan sampel adalah purposive sampling, sebanyak 32 ibu hamil pada kelompok pijat aromaterapi dan 32 ibu hamil pada kelompok latihan goyang panggul, sehingga total sampel sebanyak 64 ibu hamil. Uji analisis menggunakan uji Mc Nemar dan uji Wilcoxon. Kriteria inklusi meliputi ibu hamil trimester ketiga dengan usia kehamilan ≥ 35 minggu, berusia antara 20-35 tahun. Sedangkan kriteria eksklusi adalah ibu hamil trimester III yang memiliki penyakit penyerta seperti radang sistemik, skiatika, kelainan ginekologi, kardiovaskular, tumor, osteoporosis, atau pernah mengalami patah tulang belakang. Terdapat pengaruh pijat aromaterapi dan latihan goyang panggul terhadap kecemasan, nyeri pinggang bawah dan kualitas tidur pada ibu hamil trimester III. Pijat aromaterapi lebih efektif dibandingkan latihan goyang panggul dalam menurunkan kecemasan dan meningkatkan kualitas tidur, dengan nilai p masing-masing sebesar 0,042 dan 0,013. Keduanya sama-sama efektif dalam menurunkan nyeri pinggang bawah (nilai $p= 0,479$), dan terbukti berpengaruh terhadap keluhan trimester III pada ibu hamil.

Kata kunci: *aromatherapy massage, kecemasan, kualitas tidur, nyeri punggung bawah, pelvic rocking exercise*

ABSTRACT

The most common complaints in the last trimester of pregnancy are anxiety, lower back pain, and difficulty sleeping, which disrupts daily routines. Non-pharmacological methods such as aromatherapy massage and pelvic floor exercises are methods that help reduce anxiety, lower back pain, and overcome difficulty sleeping in pregnant women in the third trimester. This study was a quasi-experimental study with a pretest and posttest controlled group design. The sampling technique was purposive sampling, with 32 pregnant women in the aromatherapy massage group and 32 pregnant women in the pelvic floor exercise group, so that the total sample was 64 pregnant women. The analysis test used the Mc Nemar test and the Wilcoxon test. The inclusion criteria included pregnant women in the third trimester with a gestational age of ≥ 35 weeks, aged 20-35 years. While the exclusion criteria were pregnant women in the third trimester who had comorbidities such as systemic inflammation, sciatica, gynecological disorders, cardiovascular, tumors, osteoporosis, or had experienced spinal fractures. There is an effect of aromatherapy massage and pelvic floor exercises on anxiety, lower back pain, and sleep quality in pregnant women in the third trimester. Aromatherapy massage is more effective than pelvic floor exercises in reducing anxiety and improving sleep quality,

with p-values of 0.042 and 0.013, respectively. Both are equally effective in reducing lower back pain (p-value = 0.479), and have been shown to have an effect on third trimester complaints in pregnant women.

Keywords: anxiety, aromatherapy massage, lower back pain, pelvic rocking exercise, sleep quality

INTRODUCTION

The 3rd trimester of pregnancy is the period of pregnancy between the ages of 28-40 weeks in which preparations for birth and the role of parenthood are carried out, such as focusing on the presence of the baby, so it is referred to as the waiting period. In the 3rd trimester, fatigue, discomfort, and mild depression increase. Pregnant women's blood pressure usually rises, and will return to normal after childbirth.¹ In this trimester, anxiety levels are also increasing because they are worried about facing childbirth. One of the triggering factors for anxiety is pregnancy. The incidence of anxiety in pregnant women in Indonesia is currently at 28.7%, especially in pregnant women in the 3rd trimester who are about to give birth. Anxiety experienced by pregnant women can have a negative impact on the health of the mother and baby.²

The anxiety experienced by pregnant women is influenced by several main factors, namely gestational age, education level, employment status, history of miscarriage, marital relationship and fear of childbirth.³ The impact of anxiety that can affect the mother is the contraction of the uterine muscles which become weak during childbirth due to the release of the hormones cateolamine and adrenaline which can inhibit the secretion of the hormone that spurs contractions, namely oxytocin. Weak contraction of the uterine muscles causes prolonged parthus and results in increased risk of infection and fatigue in the mother as well as emotional instability before and after postpartum.^{4,5}

In pregnancy, physiological changes will occur such as hormonal changes, weight gain and growth of the baby in the

womb, while some psychological changes will occur in pregnant women with the increase in gestation age from the 1st to the 3rd trimester such as experiencing discomfort in activities, complaints of pain in the back area.² The results of research on pregnant women from various regions in Indonesia reached 60-80% of mothers experiencing back pain.⁶

Sleep is a natural need that is important for health, especially in pregnant women. Sleep disorders during pregnancy are often affected by hormonal changes and can disrupt physiological and psychological balance. In Indonesia, around 64% of pregnant women experience sleep disorders. Of these, 65% of those with sleep apnea underwent cesarean section, and 42% experienced preeclampsia. Lack of sleep, especially in the third trimester, can have negative effects such as depression and inability to take care of yourself and the baby.⁷

Aromatherapy is a treatment used to treat a variety of symptoms. It is a widely used complementary and alternative therapy worldwide derived from plants using essential oils to improve the skin's sense of smell and absorption. Management of symptoms such as illness, migraines, high blood pressure, arthritis, and muscle-related pain. Aromatherapy improves quality of life during pregnancy and postpartum care.⁸ Meanwhile, pelvic rocking exercise with gym balls is physical therapy or simple exercises using balls, where the exercise is applied to pregnant women, mothers giving birth, and mothers after childbirth.⁹

Anxiety, low back pain, and sleep disturbances are common complaints in third trimester pregnant women. Preliminary data shows that around 25% of pregnant women in the 3rd trimester

experience back pain that interferes with activities and sleep, impacting physical and psychological conditions. However, interventions provided by health workers are still limited to pregnancy education without special holistic treatment. Therefore, practical and effective nonpharmacological interventions, such as aromatherapy massage and pelvic rocking exercises, are needed. This study aims to analyze the effectiveness of the two interventions in reducing anxiety, back pain, and sleep disorders in pregnant women in the final 3rd trimester.

METHODS

This research was carried out from November to December 2024 which is located at Independent Midwife Practice throughout the city of Bengkulu. The research has met the requirements of the PSP as shown by the ethical approval from the health research ethics committee of the Ministry of Health of the Ministry of Health with number 1250/EA/F.XXIII.38/2024 which is valid from November 4, 2024 to November 4, 2025. Then all participants also gave written consent through informed consent before participating in the study.

This study used a quasi-experimental design with a pretest-posttest with control group design. The sample in the study amounted to 64 pregnant women in the final trimester who were evenly divided into two groups, namely 32 people as the intervention group and 32 people as the control group. The sampling technique used is purposive sampling, which is the selection of subjects based on certain criteria that have been determined by the researcher. The intervention group was given treatment in the form of aromatherapy massage, while the control group was given pelvic rocking exercises using gym balls. Both groups were measured before and after treatment to see the changes that occurred.

The inclusion criteria in this study include 3rd trimester pregnant women

with a gestational age of ≥ 35 weeks, aged between 20-35 years, have a vaginal delivery plan, can see clearly so that they are able to show pain points on the VAS scale, are not taking pharmacological drugs, and have never received pelvic rocking exercise treatment previously. Meanwhile, the exclusion criteria include 3rd trimester pregnant women who have comorbidities such as systemic inflammation, sciatica, gynecological abnormalities, cardiovascular, tumors, osteoporosis, or spinal fractures. In addition, pregnant women who took pharmacological drugs to relieve pain and who were not willing to become respondents were also excluded from the study.

The aromatherapy massage group received interventions three times a week during November 2024, using lavender essential oil and effleurage, petrissage, and friction massage techniques for 45 minutes each session. Meanwhile, the Pelvic Rocking Exercise group conducted exercises with gym balls three times a week during December 2024. Each exercise session consists of pelvic twisting movements, straightening the long axis of the uterus, and bouncing movements for 10–20 minutes

The study began with a pretest for anxiety, low back pain, and sleep quality in both groups. The intervention was then carried out according to each group. After one month, a re-measurement (posttest) was carried out to evaluate changes in the variables studied. Data were analyzed using the McNemar test and the Wilcoxon test to compare the pretest and posttest results in each group, as well as to assess the effectiveness of the intervention.

RESULT

This study examines the effectiveness of aromatherapy massage and pelvic rocking exercise on anxiety, low back pain, and sleep quality in 3rd trimester pregnant women. The experimental study will be carried out in

November 2024. The study was conducted on 64 pregnant women in the 3rd trimester, which was divided into two groups of Aromatherapy Massage (AM) and Pelvic Rocking Exercise (PRE) groups. None of the study subject participants were excluded from this study.

Characteristic data collection on all subjects was carried out and the data collected were analyzed descriptively and quantitatively to analyze the

effectiveness of aromatherapy massage and pelvic rocking exercise on anxiety, low back pain, and sleep quality in 3rd trimester pregnant women.

Univariate analysis was carried out to determine the characteristics of pregnant women in the 3rd trimester based on maternal age, occupation, and parity. The results of the study regarding the characteristics of pregnant women in the 3rd trimester can be seen in table 1:

Table 1. Characteristics of Research Subjects and Overview of Anxiety, Back Pain and Sleep Quality in the Aromatherapy Massage and Pelvic Rocking Exercise Group

Variabel	Category	Treatment Groups				p-value
		Aromatherapy Massage		Pelvic Rocking Exercise		
		n=32	%	n=32	%	
Mother's Age	At risk (<20 or >35)	12	37.5	10	31.3	0.792
	Not at risk (20-35)	20	62.5	22	68.8	
Parity	Primigravida	18	56.3	17	53.1	1.000
	Multigravida	14	43.8	15	46.9	
Mother's Occupation	Employed (ASN, non-ASN)	15	46.9	13	40.6	0.081
	Unemployed	17	53.1	19	59.4	
Education	Low (Elementary, Junior High)	19	59.4	18	56.3	0.734
	High (High School, D3, S1)	13	40.6	14	43.7	
Emergency Pre test	Severe Anxiety	4	12.5	10	31.3	0.191
	Moderate Anxiety	16	50.0	13	40.6	
	Mild Anxiety	12	37.5	9	28.1	
Pre test Back Pain	Severe Pain	7	21.9	9	28.1	0.843
	moderate pain	16	50.0	15	46.9	
	Mild Pain	9	28.1	8	25.0	
Pre test Sleep Quality	Poor	19	59.4	18	56.3	0.008
	Good	13	40.6	14	43.8	

The characteristics of the respondents in table 1 in both aromatherapy massage and pelvic rocking exercise treatment groups after being tested using chi square showed no significant difference with p-value = 0.734 or (homogeneous intervention group) based on characteristics of maternal age, parity, occupation and education.

After testing using chi-square in both treatment groups, the results of the homogeneity statistical test showed that pretest anxiety (p-value = 0.191), back pain (p-value = 0.843), and sleep quality (p-value = 0.800). It can therefore be concluded that the variables of anxiety, back pain and sleep quality before the

two groups received the intervention were homogeneous.

Based on Table 2, aromatherapy massage interventions three times a week for one month (45 minutes per session) showed significant results: anxiety levels decreased to the category of mild anxiety (75%) with a p-value of 0.009; back pain decreased from moderate pain (50%) to mild pain (53.1%) with a p-value of 0.002; and sleep quality improved from 59.4% (poor) to 78.1% (good) with a p-value of 0.000.

Meanwhile, in the pelvic rocking exercise intervention, there was no significant decrease in anxiety (p-value 0.072) or improvement in sleep quality (p-value 0.625), although there was a

decrease in back pain from moderate pain (46.9%) to mild pain (46.9%) with a p-value of 0.003.

Table 2. Changes in Anxiety, Back Pain and Sleep Quality after Aromatherapy Massage and Pelvic Rocking Exercise

Variabel	Aromatherapy Massage & Pelvic Rocking Exercise				p-value
	Pre test		Post test		
	N	%	n	%	
Aromatherapy Massage					
Anxiety					
Severe Anxiety	4	12.5	3	9.4	0.009
Moderate Anxiety	16	50.0	5	15.6	
Mild Anxiety	12	37.5	24	75.0	
Total	32	100	32	100	
Pain					
Severe Pain	7	21.9	5	15.6	0.002
Moderate pain	16	50.0	10	31.3	
Mild Pain	9	28.1	17	53.1	
Total	32	100	32	100	
Sleep Quality					
Poor	19	59.4	7	21.9	0.000
Good	13	40.6	25	78.1	
Total	32	100	32	100	
Pelvic Rocking Exercise					
Anxiety					
Severe Anxiety	10	31.3	5	5.6	0.072
Moderate Anxiety	13	40.6	14	43.8	
Mild Anxiety	9	28.1	13	40.6	
Total	32	100	32	100	
Pain					
Severe Pain	9	28.1	7	21.9	0.003
moderate pain	15	46.9	10	31.3	
Mild Pain	8	25.0	15	46.9	
Total	32	100	32	100	
Sleep Quality					
Poor	18	56.3	16	50.0	0.625
Good	14	43.7	16	50.0	
Total	32	100	32	100	

Based on Wilcoxon's test in Table 3, aromatherapy massage was more effective in reducing anxiety (75% mild anxiety) than pelvic rocking exercise (40.6%), with a p-value = 0.042. In back pain, both interventions showed almost the same effectiveness (p-value= 0.479). However, for sleep quality, aromatherapy massage was superior (78.1% good sleep) to pelvic rocking exercise (50%), with p-value = 0.013.

Based on the regression test in Table 4, the variables of age (p=0.034), parity (p=0.022), employment (p=0.031), and

education (p=0.041) had a significant relationship with anxiety, low back pain, and sleep quality in 3rd trimester pregnant women. Parity showed the greatest influence (OR=1.802), where primigravida mothers were more at risk of developing such complaints. Age (OR=0.402), occupation (OR=0.313), and education (OR=0.513) also contributed, suggesting that older, working, and poorly educated mothers were more likely to experience anxiety disorders and higher sleep.

Table 3. The Effectiveness of Aromatherapy Massage and Pelvic Rocking Exercise on Anxiety, Low Back Pain and Sleep Quality

Variable	Category	Intervention Group				p-value
		Aromatherapy Massage		Pelvic Rocking Exercise		
		n	%	n	%	
Post test Anxiety	Severe Anxiety	3	9.4	5	15.6	0.042
	Moderate Anxiety	5	15.6	14	43.8	
	Mild Anxiety	24	75.0	13	40.6	
Post test Back Pain	Severe Pain	5	15.6	7	21.9	0.479
	Moderate Pain	10	31.3	10	31.3	
	Mild Pain	17	53.1	15	46.9	
Post test Sleep Quality	Poor	7	21.9	16	50.0	0.013
	Good	25	78.1	16	50.0	

Table 4. Analysis of Counfounding Variables (Age, Parity, Occupation and Education) on Anxiety, Back Pain, and Sleep Quality

Variabel Counfounding	B	Wald	p-value	OR	CI 95%
Age	0.240	0.529	0.034	0.402	0.452 – 0.527
Parity	-.220	0.450	0.022	1.802	0.422 – 1.527
Occupation	0.272	0.259	0.031	0.313	0.461 – 0.740
Education	0.261	0.557	0.041	0.513	0.485 – 0.873

DISCUSSION

This study used aromatherapy massage and pelvic rocking exercise as non-pharmacological interventions to reduce anxiety, low back pain, and improve sleep quality in 3rd trimester pregnant women. The results showed that both methods were effective, but aromatherapy massage was superior in lowering anxiety and improving sleep quality. Both are easy to implement, do not require special tools, and can be done independently after health worker education.

The study used a quasi-experimental design that allowed pre- and post-intervention analysis to improve the validity of the results. However, there are limitations, such as varying responses to aromatherapy, transient effects, and external factors such as lifestyle and sleep patterns that are not fully controlled.

The implications of the research are quite broad in midwifery practice. These findings can be applied as

complementary therapies in antenatal care services, especially in health centers and independent practice of midwives, and encourage the KIA program to integrate non-pharmacological therapies to improve the welfare of pregnant women before childbirth.

Most respondents were 20–35 years old, which is the optimal reproductive age. In this age range, physical and psychological conditions are better prepared for pregnancy, the risk of complications is lower, and socio-economic support tends to be stable, thus supporting the welfare of the mother during pregnancy.¹⁰

Mothers with parity primigravida face the first pregnancy experience, which is often accompanied by high anxiety, especially in the 3rd trimester before delivery. Their ignorance about the childbirth process is a major factor in the cause of anxiety.¹¹ Primigravida mothers tend to be more anxious than multigravida because they have no previous pregnancy experience, and are

more prone to experiencing fatigue and physical discomfort. Most respondents were homemakers who were not working, allowing them to focus on pregnancy, but were also more prone to physical fatigue, especially in the 3rd trimester. Most have a low level of education (elementary/junior high), which impacts the ability to understand health information and stress management, thus increasing the risk of anxiety.

Before the intervention, the anxiety of pregnant women in the 3rd trimester was generally in the moderate category, both in the aromatherapy massage group (50%) and pelvic rocking exercise (40.6%). Some respondents even experienced severe anxiety characterized by sleep disturbances, obsessive thoughts, and mood swings. Anxiety is affected by psychological factors, such as excessive worry, and physiological, such as insomnia and heart palpitations, which are exacerbated by a lack of social support and hormonal changes.

Back pain was also dominant in the moderate category in both groups. In the aromatherapy massage group, 50% of mothers experienced moderate pain, and 21.9% experienced severe pain. In the pelvic exercise group, 46.9% had moderate pain and 28.1% severe pain. This pain is caused by changes in posture, uterine enlargement, and relaxation hormones. These findings confirm the need for non-pharmacological therapies such as relaxation massage or pregnancy exercises to reduce complaints of pain and anxiety ahead of childbirth.

This study is in line with the research of Khairunnisa et al (2022) that the most frequent complaints experienced are moderate back pain with a total of 60%. The location of this lower back pain usually occurs in the lumbar (lower back) due to increased mechanical load, then the location in the sacroiliac pain around the pelvic bone due to relaxation of the ligaments.¹²

The sleep quality of pregnant women in the 3rd trimester before the intervention was largely poor. In the aromatherapy massage group, 59.4% of mothers experienced poor sleep quality, with a sleep duration of less than 5 hours per night, difficulty sleeping, and often waking up at night. In the pelvic rocking exercise group, 56.3% of mothers also experienced poor sleep quality with similar symptoms. This shows that physical, hormonal, and emotional changes during the 3rd trimester significantly affect the sleep quality of pregnant women.

The mechanism of action of aromatherapy in the body takes place through two physiological systems, namely the body's circulatory system and the olfactory system. There are two types of physiological effects of scent that work through the stimulation of the nervous system and organs, and that directly affect organs or tissues through effector-receptor mechanisms. A molecule in an aroma or smell is easily vaporized into the air and will enter the nasal cavity through inhalation so that it will be recorded by the brain as an olfactory process. Neuronal cells interpret the smell and deliver it to the limbic system. The limbic system is the center of pain, pleasure, anger, fear, depression, and various other emotions that are captured through the amygdala and hippocampus.¹³ Through the response delivered by the hypothalamus, the components in the essential oils are channeled through the nervous system to the circulatory system and chemical agents, then to the organs of the body to affect conditions such as anxiety or depression, low back pain, and sleep quality in third trimester pregnant women.^{14,15}

After being given aromatherapy massage three times a week for one month with a duration of 45 minutes, the anxiety level of pregnant women decreased significantly. Most respondents who had previously experienced moderate anxiety (50%)

showed a decrease to the category of mild anxiety (75%), with a p-value = 0.009. This decrease indicates that aromatherapy massage is effective in reducing anxiety in pregnant women in the 3rd trimester.

Lower back pain in pregnant women also showed a decrease after aromatherapy massage. Most of the respondents who experienced moderate pain (50%) switched to the mild pain category (53.1%), with p-value = 0.002. This reduction in pain suggests that aromatherapy massage is effective in reducing low back pain. The mechanism of action of aromatherapy massage involves stimulating the release of endorphins, improving blood circulation, as well as releasing muscle tension in the lower back. Lavender essential oil also has anti-inflammatory and analgesic properties, which help reduce pain and provide a relaxing effect.⁹ The sleep quality parameters of pregnant women in the 3rd trimester also showed significant improvement after aromatherapy massage. Before the intervention, most respondents experienced poor sleep quality (59.4%). After the intervention, 78.1% of respondents reported an improvement in sleep quality to be good, with a p-value = 0.000. This change is characterized by an increase in sleep duration (7-9 hours per night), less sleep disturbances, and waking up feeling refreshed and fit. The combination of massage and lavender essential aroma helps lower levels of the hormone cortisol and increases relaxation hormones such as serotonin and melatonin, which support the natural sleep cycle. These results confirm that aromatherapy massage can be an effective nonpharmacological intervention to reduce anxiety, back pain, and improve sleep quality in pregnant women in the third trimester.^{16,17}

Pelvic rocking exercises are simple exercises that involve gentle movements of the pelvis to help reduce

muscle tension, increase flexibility, and prepare the pregnant woman's body for childbirth. This exercise is often used to reduce pain, especially in the lower back area, and improve posture during pregnancy.¹⁸

The results showed that after being given pelvic rocking exercise there was no significant decrease in anxiety in this group. As many as 40.6% of respondents remained in the category of moderate anxiety before and after the intervention, with a p-value = 0.072. This shows that pelvic rocking exercise is not effective in reducing anxiety in pregnant women in the 3rd trimester. Although they do not show significant results, some studies support that light physical exercise, such as pelvic rocking exercise, can help relieve tension and promote relaxation. However, in this study, the duration and methods used may not be optimal to have an impact on reducing anxiety. In contrast to the results of a study conducted by Gusrida Umairo (2024), stating that there is a significant influence between pelvic rocking exercise and slow deep breathing relaxation on the progress of the first phase of labor in 2024 with a p-value = 0.000. This pelvic rocking exercise and slow deep breathing relaxation intervention can be applied by maternity mothers so that mothers can give birth safely, comfortably, reduce anxiety and in a faster time than without intervention.¹⁹

Low back pain decreased significantly after the pelvic rocking exercise intervention, with 46.9% of respondents switching from moderate to mild pain (p-value = 0.003). This exercise effectively relieves pain by increasing the flexibility of the pelvic and back muscles, as well as improving blood circulation, thereby reducing tension and discomfort.²⁰

Based on the results of the study, there was no significant change in the sleep quality of pregnant women after being given pelvic rocking exercise. As many as 50% of respondents still

experienced good sleep quality, while the other 50% remained in the category of poor sleep quality, with p -value = 0.625. Obstacles to good sleep in pregnant women in the 3rd trimester include physical disorders, such as back pain, uncomfortable sleeping positions, as well as psychological factors, such as anxiety. Although pelvic rocking exercise may help improve muscle relaxation and pelvic flexibility, these effects were not significant enough to improve sleep quality in this study.⁵

These results confirm that pelvic rocking exercises are effective in lowering low back pain, but not effective in lowering anxiety and improving sleep quality. Further research is needed to explore more varied durations, intensities, and methods of exercise to improve the effectiveness of these interventions on aspects of anxiety and sleep quality. In addition, combinations with other therapies, such as counseling or aromatherapy massage, can be considered for more optimal results.

Aromatherapy massage is more effective in reducing anxiety than pelvic rocking exercise (p -value = 0.042), thanks to the combination of massage and the aroma of essential oils that soothe the central nervous system. Oils like lavender help lower stress hormones and increase serotonin.

Both were equally effective in relieving low back pain (p -value = 0.479). Aromatherapy massage works through muscle relaxation and the anti-inflammatory effects of essential oils, while pelvic rocking exercises relieve pain by activating core muscles, improving posture, and increasing blood flow.²¹

Aromatherapy massage is also more effective in improving sleep quality compared to pelvic rocking exercise (p -value = 0.013). The combination of massage and the aroma of essential oils helps lower cortisol levels and increases the release of melatonin, a hormone that regulates the sleep cycle. The deep relaxation effect of this therapy allows

pregnant women to sleep better and wake up feeling refreshed. Pelvic rocking exercise showed no significant improvement in sleep quality (p -value = 0.625). These exercises focus more on physical benefits, such as reducing pain and improving flexibility, which can indirectly help with sleep, but do not directly affect the sleep cycle.

The results of this study show that aromatherapy massage is more effective in reducing anxiety and improving sleep quality because the lavender oil content works to calm the nervous system and help the body relax more. Meanwhile, pelvic rocking exercises play a greater role in reducing low back pain through gentle movements that train the pelvic muscles and improve posture. Therefore, both are equally effective for back pain, but aromatherapy massage has advantages in the psychological aspect of pregnant women.

The implementation of these two methods in obstetric services can provide significant benefits for pregnant women. Aromatherapy massage can be used as the primary therapy to overcome anxiety and sleep disorders, while pelvic rocking exercises can be an additional exercise to reduce back pain and prepare the body for labor. More research is needed to explore the combination of these two methods for more optimal results.

Statistical tests showed that age had a significant effect on anxiety, low back pain, and sleep quality (p -value = 0.034). Older pregnant women are more prone to experiencing pain due to decreased muscle elasticity and inflammatory responses, and are more anxious about labor complications. In contrast, younger mothers respond better to aromatherapy massage, while older age groups take longer to experience the benefits of pelvic rocking exercise. Decreased sleep quality is also more common in older age due to physical and psychological factors.^{7,18,21}

Parity had a significant relationship with anxiety, low back pain, and sleep quality (p -value = 0.022). An OR value of 1.802 indicates that primigravida mothers have a higher chance of experiencing anxiety, low back pain, and sleep disturbances compared to multipara mothers. Primigravida mothers often face greater anxiety related to the uncertainty of childbirth and parental responsibilities. The combination of aromatherapy massage and pelvic rocking exercise helps to promote physical and mental relaxation, thus supporting better sleep.

In this context, aromatherapy massage provides a relaxing effect by stimulating the production of serotonin, while pelvic rocking exercises help relieve back pain due to prolonged sitting or standing positions.²²

The results of the analysis showed that the variables of age, parity, and occupation affected anxiety, low back pain, and sleep quality in 3rd trimester pregnant women. Primigravida mothers and older mothers tend to be more susceptible to this disorder, while physically or mentally demanding jobs exacerbate existing complaints. Aromatherapy massage and pelvic rocking exercise have been shown to be effective in overcoming physical and psychological complaints in pregnant women, with aromatherapy massage providing greater benefits for anxiety and sleep quality.

CONCLUSION

The study concluded that most of the respondents were of non-risk, non-working, and primigravida age. Before the intervention, anxiety and back pain were generally moderate, as well as poor sleep quality. Aromatherapy massage and pelvic rocking exercise have been shown to be effective in reducing anxiety and back pain and improving sleep quality, with aromatherapy massage being superior in reducing anxiety and improving sleep. Age, parity, employment, and education factors have a significant effect on these

complaints, with parity as the dominant factor. Further research is recommended to examine the long-term effects and application of aromatherapy massage in primary health services.

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