

Research Article

The Effectiveness of Back Massage Using Lavender on Sleep Quality in Pregnant Women

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Abstract: The most frequent complaint among pregnant women, particularly during the second and third trimesters, is sleep difficulties. Emotional disorders, physical exhaustion, and a higher chance of pregnancy difficulties can all result from poor sleep. Back massage combined with lavender aromatherapy is one non-pharmacological treatment that has been shown to be safe for enhancing the quality of sleep. The purpose of this study was to evaluate the impact of lavender back massage on pregnant women's sleep quality. Thirty third-trimester pregnant women in the West Halmahera Community Health Center (Puskesmas) operating area participated in the study, which employed a pre-experimental design and a one-group pretest-posttest methodology. The Pittsburgh Sleep Quality Index (PSQI) was used to assess the quality of sleep. According to the findings, the majority of respondents (76.7%) experienced poor sleep quality before to the back massage, with an average PSQI score of 11.2. The PSQI score dropped to 6.1 following three days of lavender back massages, indicating a substantial improvement in sleep quality. The Wilcoxon statistical test revealed a substantial increase in sleep quality following the intervention, with $p = 0.000$. According to the study's findings, back massage with lavender can be suggested as a safe supplemental therapy in prenatal care services as it effectively improves pregnant women's sleep quality.

Keywords: Back Massage; Lavender Aromatherapy; Pregnancy; Pregnant Women; Sleep Quality.

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1. Introduction

Pregnancy is a physiological process experienced by women, but the changes that occur during pregnancy often cause various discomforts, both physical, hormonal, and psychological. Sleep disruption is one of pregnant women's most frequent concerns. Because sleep is essential for preserving pregnant women's physical and mental equilibrium as well as promoting optimum fetal growth and development, poor sleep quality is a serious health problem (Reid et al., 2017; Sedov et al., 2018).

Various studies have shown a high prevalence of sleep disorders in pregnant women. Approximately 70–80% of pregnant women report experiencing decreased sleep quality, especially in the third trimester (Mindell et al., 2015). Sleep disorders include difficulty falling asleep, frequent nighttime awakenings, short sleep duration, feeling unrefreshed upon waking, nightmares, and insomnia. These conditions increase as pregnancy progresses and labor approaches (Okun, 2019).

Physiologically, sleep disturbances in the final trimester of pregnancy are influenced by the enlarging uterus, which presses on the bladder and surrounding organs, causing pregnant women to wake up more frequently to urinate. Furthermore, back pain, leg cramps, shortness of breath, and difficulty finding a comfortable sleeping position contribute to poor sleep

quality (Facco et al., 2017). Postural changes due to weight gain also cause muscle tension, particularly in the back and lumbar region, which contributes to sleep discomfort (Wang et al., 2016).

Hormonally, increased progesterone levels during pregnancy affect sleep regulation by increasing daytime sleepiness but decreasing nighttime sleep quality. Furthermore, changes in estrogen and cortisol hormones also play a role in increasing the frequency of awakenings and decreasing the stability of sleep cycles (Mindell & Jacobson, 2000). Psychologically, anxiety before labor, fear of labor pain, concern for the fetus, and social and economic stress can exacerbate sleep disorders in pregnant women (Biaggi et al., 2016).

Maternal and fetal health can be severely impacted by untreated sleep disturbances. An increased risk of gestational hypertension, preeclampsia, prenatal depression, persistent tiredness, and reduced mother immunity is linked to poor sleep quality (Okun et al., 2018). Additionally, sleep disturbances are linked to elevated levels of stress hormones like cortisol, which can disrupt fetal development and uteroplacental perfusion, raising the risk of low birth weight and premature birth (Chang et al., 2010; Micheli et al., 2011). Thus, enhancing pregnant women's sleep quality is a crucial component of complete antenatal care (ANC) services.

Various efforts have been made to address sleep disorders in pregnant women, using both pharmacological and non-pharmacological approaches. However, the use of sleeping pills in pregnant women is not recommended due to the potential for side effects, dependency, and risks to the fetus (Signal et al., 2017). Therefore, non-pharmacological interventions are the primary choice due to their safety, ease of implementation, and minimal side effects. One widely used non-pharmacological method is back massage.

Back massage is a touch therapy that aims to relax muscles, improve blood circulation, reduce pain, and reduce physical and psychological tension. The mechanism of action of back massage involves stimulating sensory nerves, which can inhibit the transmission of pain impulses and increase the release of endorphins, which provide a relaxing and comforting effect (Field, 2014). Back massage has been demonstrated to be beneficial for lowering anxiety, alleviating back discomfort, and enhancing sleep quality in expectant mothers (Kafaei Atrian et al., 2018).

Combining lavender aromatherapy with back massage can increase its efficacy. The active ingredients of lavender (*Lavandula angustifolia*) include linalool and linalyl acetate, which have calming, sedative, and anxiolytic properties. Lavender aromatherapy reduces sympathetic nervous system activity, lowers anxiety, and improves sleep patterns through the olfactory system, which is directly linked to the limbic system in the brain (Koulivand et al., 2013). Lavender aromatherapy has been shown to increase the length of sleep, decrease the number of awakenings, and enhance the general quality of sleep (Hwang & Shin, 2015).

The combination of back massage and lavender aromatherapy provides a dual relaxing effect, through both tactile and olfactory stimulation. This intervention is highly suitable for pregnant women because it is safe, easy to perform, and can increase comfort without risk to the mother or fetus (Chang et al., 2021). Several studies have reported that massage with lavender aromatherapy significantly reduces Pittsburgh Sleep Quality Index (PSQI) scores in pregnant women, indicating a significant improvement in sleep quality (Keshavarz Afshar et al., 2015).

Although numerous international studies have demonstrated the effectiveness of lavender aromatherapy back massage, research on its application to pregnant women in Indonesia, particularly in West Halmahera, remains limited. Most antenatal care (ANC) services in the region still focus on routine physical examinations, while maternal comfort, including sleep quality, has not received optimal attention. Many pregnant women complain of difficulty sleeping, yet they have not received appropriate and ongoing non-pharmacological interventions.

Given this context, it is essential to examine the impact of lavender aromatherapy back massage on pregnant women's sleep quality. The findings should give medical professionals—especially midwives—a solid scientific foundation for incorporating this supplementary treatment into prenatal care services. Therefore, back massage using lavender can be recommended as a safe, effective, and easy-to-implement non-pharmacological approach to improving sleep quality and well-being in pregnant women.

2. Preliminaries or Related Work or Literature Review

This study measured pregnant women's sleep quality before and after getting a back massage intervention utilizing lavender aromatherapy using a pre-experimental design with a one-group pretest–posttest methodology. In January and February of 2025, the study was carried out in the West Halmahera Community Health Center's operational region. Thirty third-trimester pregnant women who met the following criteria—no lavender allergies, no pregnancy problems, and willingness to engage in the intervention—were chosen for the research sample using a purposive sampling approach. The sample did not include respondents with acute medical problems or skin diseases.

Lavender back massage, a 20-minute mild massage treatment using 2% lavender oil, was the independent variable. The Pittsburgh Sleep Quality Index (PSQI) was used to measure sleep quality, which was the dependent variable. Three days in a row, PSQI questionnaires were used to gather data both before and after the intervention.

The intervention was carried out using simple back massage techniques (effleurage, petrissage, and friction) once a day. After the entire series of interventions were completed, respondents completed the PSQI again as a posttest. Bivariate analysis using the Wilcoxon Signed Rank Test was used to compare sleep quality scores before and after the intervention, with a significance threshold of $\alpha = 0.05$. Univariate analysis was used to characterize respondent characteristics and the distribution of sleep quality. The study was carried out in accordance with ethical guidelines, including respondent safety, data confidentiality, and informed consent.

3. Materials and Method

Thirty third-trimester pregnant women who satisfied the inclusion criteria participated in this study. The findings included a univariate analysis and a comparison of the quality of sleep before and after a lavender aromatherapy back massage.

Research results

The problem should be explained in writing from the general to the specific. To explain each problem, use relevant references. Each reference used should be listed in the bibliography or references section, and each reference listed there should be cited in the body of the essay.

Respondent Characteristics

The following table shows the distribution of age and parity of pregnant women.

Table 1. Respondent Characteristics (n = 30).

Characteristics	Category	Frequency	Percentage
Mother's Age	20–25 years	8	26.7%
	26–30 years	12	40.0%
	31–35 years	10	33.3%
Parity	Primigravida	11	36.7%
	Multigravida	19	63.3%

The majority of respondents were aged 26–30 years (40%), and most were multigravida (63.3%). These characteristics align with the profile of third-trimester pregnant women at the West Halmahera Community Health Center.

Sleep Quality Before Intervention (Pretest)

Before receiving a lavender back massage, the pregnant women's sleep quality was assessed using the PSQI.

Table 2. Sleep Quality Before Intervention.

Category	Frequency	Percentage
Good	7	23.3%
Bad	23	76.7%

The average PSQI score was 11.2, indicating that most respondents experienced poor sleep quality.

Sleep Quality After Intervention (Posttest)

After 3 consecutive days of intervention, a re-assessment of sleep quality was carried out.

Table 3. Sleep Quality After Intervention.

Category	Frequency	Percentage
Good	21	70%
Bad	9	30%

Sleep quality improved, as indicated by an increase in the good sleep category. The average PSQI score decreased significantly to 6.1.

Changes in Mean Pretest–Posttest Scores

Table 4. Average PSQI Scores Before and After Intervention.

Variables	Mean Pretest	Mean Posttest	Difference
PSQI Score	11.2	6.1	5.1

A decrease in PSQI score of 5.1 points indicates an improvement in sleep quality after the intervention.

Wilcoxon Statistical Test

To determine the effectiveness of the intervention, the Wilcoxon Signed Rank Test was conducted.

Table 5. Results of the Wilcoxon Pretest–Posttest Test.

Variables	Z	p-value	Information
PSQI Score	-4,872	0,000	Significant

Interpretation: A significant difference between the sleep quality ratings before and after the intervention is indicated by a p-value of 0.000 ($p < 0.05$). This indicates that pregnant women's sleep quality is successfully enhanced by back massage combined with lavender aromatherapy.

With an average PSQI score of 11.2, the majority of pregnant women (76.7%) had poor sleep quality prior to the lavender aromatherapy back massage intervention. This suggests that because of the physical and hormonal changes that occur during pregnancy, sleep disruptions are still a typical issue for pregnant women.

70% of respondents reported having excellent sleep quality following the intervention, and the average PSQI score dropped to 6.1, indicating a considerable improvement in pregnant women's sleep quality. The Wilcoxon test revealed a significant difference between before and after the intervention, with a p-value of 0.000 ($p < 0.05$). Thus, it has been demonstrated that back massage combined with lavender aromatherapy helps pregnant women relax, feel more comfortable, and sleep better.

Discussion

The findings demonstrated that third-trimester pregnant women's sleep quality was considerably enhanced by back massage with lavender aromatherapy. There was a significant improvement following the intervention, as seen by the shift in the sleep quality category from 76.7% of moms with poor sleep quality in the pretest to 70% with excellent sleep quality

in the posttest. The intervention's statistically significant efficacy was validated by a drop in PSQI scores from 11.2 to 6.1 and a Wilcoxon test result with a p-value of 0.000. These results imply that a supplementary approach to treating sleep disturbances in third-trimester pregnant women is the combination of back massage and lavender aromatherapy.

The physiological changes brought about by the massage procedure are directly linked to improved sleep quality following intervention. By lowering sympathetic nervous system activity, back massage can improve blood circulation, ease tense muscles, and increase the relaxation response. The main causes of sleep disruptions during the third trimester of pregnancy include weight increase, back discomfort, and muscular tension brought on by posture abnormalities. Frequent back massages help ease tense muscles, improving moms' ability to fall asleep and stay asleep all night.

Furthermore, the use of lavender aromatherapy significantly contributes to improving sleep quality through neurophysiological mechanisms. Active compounds such as linalool and linalyl acetate have sedative and anxiolytic effects that work through the limbic system, reducing anxiety, decreasing sympathetic nervous activity, and increasing alpha brain waves associated with relaxation. In the context of pregnant women, anxiety before labor, concerns about the fetus, and hormonal changes are psychological factors that can worsen sleep quality. Lavender helps reduce emotional tension, enabling mothers to achieve deeper and more effective sleep.

The synergy between back massage and lavender aromatherapy produces more optimal results than either intervention alone. Massage provides physical relaxation, while lavender promotes mental relaxation. The combination of these two mechanisms produces a stronger physiological response that reduces tension and creates a more sleep-ready state. This is reflected in research results showing significant improvements in sleep quality in a relatively short time, after three interventions.

The findings of this study align with several previous studies that found lavender massage and aromatherapy to be effective in improving sleep quality for pregnant women. Hwang et al. (2019) and Nurjanah & Fadilah (2022) found that lavender can reduce insomnia and improve sleep efficiency. Meanwhile, Mulyani & Restu (2021) and Ismail & Sari (2020) found that back massage significantly improved the comfort and sleep quality of pregnant women by reducing muscle tension.

In relation to the theory of sleep needs in pregnant women, the third trimester is the period when sleep disturbances are most common due to anatomical and physiological changes. Therefore, safe, easy-to-perform, and side-effect-free non-pharmacological interventions, such as back massage and lavender aromatherapy, are highly recommended. These therapies promote pregnant women's emotional health in addition to their physical concerns, which helps them be ready for delivery.

The study's findings have significant ramifications for obstetric treatment. Back massage with lavender aromatherapy can be used as a complementary intervention in antenatal care (ANC), both in health facilities and as an educational tool for families to practice independently at home. Furthermore, this method can be incorporated into prenatal classes as a recommended relaxation technique to improve mothers' quality of life during pregnancy.

Despite its noteworthy findings, this study had a number of shortcomings, including the absence of a control group and a lack of strict control for outside factors including daily activities, stress levels, and sleep environments. To increase the validity of the findings, it is advised that future studies employ an experimental design with a control group and keep an eye on confounding variables.

Overall, the study's findings demonstrate that back massage combined with lavender aromatherapy is a successful intervention for enhancing third-trimester pregnant women's sleep quality through both psychological and physical processes. This is a straightforward, safe technique that can be used in conjunction with supplemental obstetric care.

4. Results and Discussion

It may be inferred from the findings of the study on the Effectiveness of Back Massage Using Lavender on the Sleep Quality of Pregnant Women that back massage intervention with lavender aromatherapy is successful in enhancing the third trimester sleep quality of pregnant women.

With an average PSQI score of 11.2, the majority of respondents (76.7%) experienced poor sleep quality prior to the intervention. Following three days of the intervention, there was a notable improvement, with the average PSQI score dropping to 6.1 and 70% of

responders reporting satisfactory sleep quality. The results of the Wilcoxon test showed a p value = 0.000 ($p < 0.05$) which means there was a significant difference between sleep quality before and after the intervention. Thus, back massage using lavender aromatherapy has been proven to provide a relaxing effect, reduce muscle tension, reduce stress, and increase maternal comfort so that sleep quality improves.

Suggestion

For Pregnant Women : It is hoped that you can take advantage of back massage with lavender aromatherapy as a safe relaxation effort to improve comfort and sleep quality. For Health Workers (Midwives and Nurses) : to integrate back massage with lavender aromatherapy as a complementary therapy in antenatal care services to help improve the quality of sleep for pregnant women, especially in the third trimester. For Health Service Facilities : to support the implementation of safe and evidence-based non-pharmacological interventions through education and class activities for pregnant women. For Further Researchers : To get more thorough results, it is advised to employ a more robust study design with a control group and take into account additional variables that can affect pregnant women's sleep quality.

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