

The Effect of Effleurage Massage Using Lavender Oil on the Sleep Quality of Third Trimester Pregnant Women

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Abstract

Sleep quality disorders are one of the complaints often experienced by pregnant women in the third trimester due to physiological changes, physical discomfort, and psychological changes that occur during pregnancy. One non-pharmacological intervention that can be used to tackle this problem is effleurage massage using lavender oil, which has a relaxation effect through touch stimulation and aromatherapy. This study aims to determine the effect of Effleurage Massage using lavender oil on the sleep quality of third-trimester pregnant women in the working area of Sukorame Health Center, Kediri City. Used a pre-experimental design a one-group pretest-posttest design approach. The study sample consisted of 30 third-trimester pregnant women selected using accidental sampling technique according to inclusion and exclusion criteria. Data were collected using the Pittsburgh Sleep Quality Index (PSQI) to measure sleep quality before and after the intervention. Intervention in three sessions via home visits. Data were analyzed using the Wilcoxon Signed Rank Test. Before the intervention, most respondents had poor to very poor sleep quality after the intervention, 27 respondents (90%) reported an improvement to good sleep quality. The average PSQI score decreased from 9.87 to 6.33, and the statistical test results showed an Asymp. Sig. (2-tailed) value of 0.000 ($p < 0.05$), indicating a significant effect of effleurage massage using lavender oil on the sleep quality of pregnant women in their third trimester. Future research is recommended to employ a design with a control group, a larger sample size, and measurements of psychological and environmental factors to enhance the validity of the research findings.

Keywords: Effleurage Massage, Lavender Oil, Sleep Quality, Third Trimester Pregnant Women, Non Pharmacological Therapy.

1. INTRODUCTION

Pregnancy is a physiological process that begins with fertilization, followed by implantation, placental development, and fetal growth until birth. A normal pregnancy lasts approximately 280 days or 40 weeks from the first day of the last menstrual period and is commonly divided into three trimesters: the first trimester extends from conception to 12 weeks, the second trimester from 13 to 27 weeks, and the third trimester from 28 weeks until delivery. Each trimester is characterized by specific maternal adaptations; however, the third trimester is often associated with more pronounced physical and psychological discomfort due to rapid fetal growth and uterine enlargement.

During pregnancy, women experience anatomical, hormonal, physiological, and psychological changes that may interfere with daily functioning and sleep. In the third trimester, common complaints include frequent urination, dyspnea, back pain, leg cramps, fatigue, nocturnal fetal movement, anxiety before childbirth, and difficulty finding a comfortable sleeping position. These conditions may reduce sleep duration, increase nocturnal awakenings, and impair subjective sleep quality. Poor sleep quality is frequently reported during pregnancy, and its prevalence tends to increase with advancing gestational age. A systematic review and meta-analysis conducted in low- and middle-income countries found that poor sleep quality affected 37.46% of pregnant women in the first trimester, 47.62% in the second trimester, and 60.05% in the third trimester (Mislu et al., 2024). A cross-sectional study in China also found that more than half of pregnant women experienced poor sleep quality, with the third trimester being associated with a greater risk of sleep disturbance (Zhang et al., 2021). In addition, a

global systematic review and meta-analysis reported that symptoms of insomnia during pregnancy remain highly prevalent across different populations (Yang et al., 2024).

Sleep disturbance during pregnancy is not merely a comfort-related problem but may also affect maternal and fetal well-being. Poor maternal sleep has been associated with fatigue, emotional instability, anxiety, reduced quality of life, impaired immune response, and increased physiological stress. During late pregnancy, inadequate sleep may also be associated with unfavorable prenatal, birth, and early postnatal outcomes (Abay et al., 2024). These findings indicate that sleep quality should be assessed as part of antenatal care, particularly among third-trimester pregnant women who are more vulnerable to sleep disruption.

The pharmacological management of sleep disturbances during pregnancy requires careful consideration because of potential maternal and fetal safety concerns. Consequently, non-pharmacological interventions are increasingly recommended as supportive approaches in antenatal care. Complementary therapies, including relaxation techniques, exercise, yoga, massage, and aromatherapy, have been used to reduce pregnancy-related discomfort and improve maternal well-being (Lima-De-La-Iglesia et al., 2024). Among these approaches, pregnancy massage is considered a feasible intervention because it is simple, relatively inexpensive, and can be administered with appropriate safety precautions.

Effleurage massage is a gentle massage technique characterized by rhythmic, superficial stroking movements using light-to-moderate pressure. This technique may promote relaxation, reduce muscle tension, improve circulation, enhance comfort through tactile stimulation, and support parasympathetic nervous system activity. When performed correctly and in the absence of contraindications, massage has been reported to reduce stress, anxiety, musculoskeletal discomfort, and other pregnancy-related complaints (Mueller & Grunwald, 2021). These effects may indirectly improve sleep quality by reducing physical discomfort and emotional tension before bedtime.

Lavender oil, derived from *Lavandula angustifolia*, is one of the most widely used essential oils in aromatherapy. Its primary bioactive components include linalool and linalyl acetate, which are associated with sedative, anxiolytic, and relaxing effects. Aromatherapy may influence the central nervous system through olfactory stimulation and limbic system pathways, thereby promoting relaxation and improving sleep. A systematic review and meta-analysis found that aromatherapy significantly improved anxiety and sleep quality among women during pregnancy and other maternal periods (Wang et al., 2025). Clinical evidence also supports the anxiolytic potential of *Lavandula angustifolia*, suggesting that lavender-based interventions may be useful as supportive non-pharmacological therapies (Manzoor et al., 2025).

The combination of effleurage massage and lavender oil may provide synergistic benefits through tactile stimulation and aromatherapeutic relaxation. Effleurage massage may reduce muscle tension and physical discomfort, whereas lavender oil may enhance relaxation and sleep readiness through its calming aroma. This combined approach is particularly relevant for third-trimester pregnant women because sleep disturbances during this period are often caused by both physical discomfort and psychological tension. However, studies specifically examining the effect of effleurage massage using lavender oil on sleep quality among third-trimester pregnant women remain limited.

A preliminary interview conducted in November at Sukorame Public Health Center found that 80% of 10 third-trimester pregnant women experienced sleep disturbances. Considering the high frequency of sleep problems during late pregnancy and the need for safe, simple, and feasible non-pharmacological interventions, this study was conducted to determine the effect of effleurage massage using lavender oil on the sleep quality of third-trimester pregnant women in the working area of Sukorame Public Health Center, Kediri City.

2. METHOD

This study employed a quantitative pre-experimental design with a one-group pretest-posttest approach to examine the effect of effleurage massage using lavender oil on sleep quality among third-trimester pregnant women. The study was conducted from April 15 to May 2, 2026, in the working area of Sukorame Public Health Center, Kediri City. The population consisted of all third-trimester pregnant women registered in the antenatal care records of the health center. A total of 30 respondents were selected using a modified accidental sampling technique based on eligibility screening from ANC records. The inclusion criteria were third-trimester pregnancy of ≥ 28 weeks, willingness to participate, registration for antenatal care at Sukorame Public Health Center, and signed informed consent. Pregnant women with lavender oil allergy, severe psychiatric disorders, pregnancy complications, or medically diagnosed chronic insomnia were excluded.

Primary data were collected using the Pittsburgh Sleep Quality Index (PSQI) questionnaire before and after the intervention, while secondary data were obtained from medical records and maternal and child health books to verify eligibility. The intervention consisted of effleurage massage using lavender oil, administered by a certified therapist through home visits for 15–20 minutes per session over three consecutive days, followed by posttest assessment on the fourth day. Data were processed through editing, scoring, coding, entry, and cleaning. Univariate analysis was used to describe respondent characteristics and sleep quality distribution, while bivariate analysis was performed to assess differences in PSQI scores before and after the intervention. The Shapiro-Wilk test was used to assess data normality, followed by either a paired t-test for normally distributed data or the Wilcoxon signed-rank test for non-normally distributed data, with a significance level of $p \leq 0.05$.

3. RESULT AND DISCUSSION

RESULT

Table 1. Respondent Characteristics Based on Age, Gestational Age, Parity, Education, and Occupation among Third-Trimester Pregnant Women in the Working Area of Sukorame Public Health Center, Kediri City

Respondent Characteristics	Frequency (f)	Percentage (%)
Age (years)		
<20 years	1	3.3
20–35 years	28	93.3
>35 years	1	3.3
Gestational Age		
28–31 weeks (early third trimester)	13	43.3
32–36 weeks (mid-third trimester)	5	16.7
37–40 weeks (term pregnancy)	12	40.0
Parity		
Primigravida	13	43.3
Multigravida	17	56.7
Education		
Basic education, elementary/junior high school	2	6.7
Secondary education, senior/vocational high school	24	80.0
Higher education, diploma/bachelor/master degree	4	13.3
Occupation		
Unemployed/housewife	19	63.3
Employed	11	36.7

Based on table 1, the age distribution of the respondents showed a relatively homogeneous pattern. Of the 30 pregnant women who participated in this study, 28 respondents, or 93.3%, were in the age range of 20–35 years. Only two respondents were categorized as being in the risk-age group, consisting of one respondent aged under 20 years and one respondent aged over 35 years, each representing 3.3%.

Based on gestational age, most respondents were at 28–31 weeks of pregnancy, totaling 13 respondents or 43.3%. A similar proportion was found among respondents at term pregnancy, 37–40 weeks, with 12 respondents or 40.0%. Meanwhile, five respondents, or 16.7%, were at 32–36 weeks of gestation.

In terms of parity, 17 respondents, or 56.7%, were multigravida, while 13 respondents, or 43.3%, were primigravida. This indicates that most respondents had experienced a previous pregnancy.

Based on educational level, most respondents had completed senior or vocational high school, accounting for 24 respondents or 80.0% of the total sample. This proportion was higher than that of other educational categories.

Based on occupation, 19 respondents, or 63.3%, were housewives, while 11 respondents, or 36.7%, were employed. This distribution indicates that most respondents were not formally employed, although they may still have performed intensive daily activities within the household.

Table 2. Frequency Distribution of Sleep Quality among Third-Trimester Pregnant Women Before Effleurage Massage Using Lavender Oil

Category	Frequency (n)	Percentage (%)
Good, score 0–7	3	10.0
Poor, score 8–14	26	86.7
Very poor, score >14	1	3.3
Total	30	100.0

Based on table 2, before the intervention or pretest, most respondents were in the poor sleep quality category, totaling 26 respondents or 86.7%. One respondent, or 3.3%, was in the very poor sleep quality category, while three respondents, or 10.0%, were in the good sleep quality category.

Table 3. Frequency Distribution of Sleep Quality among Third-Trimester Pregnant Women After Effleurage Massage Using Lavender Oil

Category	Frequency (n)	Percentage (%)
Good, score 0–7	27	90.0
Poor, score 8–14	3	10.0
Very poor, score >14	0	0.0
Total	30	100.0

Based on table 3, after the intervention or posttest, changes were observed in the frequency distribution of respondents' sleep quality. Most respondents were in the good sleep quality category, totaling 27 respondents or 90.0%. A small proportion of respondents, three respondents or 10.0%, remained in the poor sleep quality category, and no respondents were in the very poor sleep quality category. These findings indicate an improvement in sleep quality among third-trimester pregnant women after receiving the intervention.

Table 4. Frequency Distribution of Sleep Quality among Third-Trimester Pregnant Women Before and After Effleurage Massage Using Lavender Oil

Category	Pretest		Posttest	
	(f)	(%)	(f)	(%)
Good, score 0–7	3	10.0	27	90.0
Poor, score 8–14	26	86.7	3	10.0
Very poor, score >14	1	3.3	0	0.0
Total	30	100.0	30	100.0

Based on table 4, a marked change in respondents' sleep quality was observed after the intervention. Before the intervention, sleep disturbance dominated the respondents' condition, with 26 pregnant women, or 86.7%, classified as having poor sleep quality and one respondent, or 3.3%, classified as having very poor sleep quality. This finding suggests that almost all respondents experienced evident sleep disturbances rather than mild sleep complaints.

After the intervention was administered regularly using effleurage massage with lavender essential oil, a notable improvement was observed. Most respondents, 27 individuals or 90.0%, improved to the good sleep quality category. This change was reflected not only in the reduced sleep quality scores but also in more stable sleep experiences. Some respondents reported shorter sleep latency and fewer nocturnal awakenings. These findings indicate that the intervention contributed to improving sleep quality among third-trimester pregnant women.

DISCUSSION

Sleep Quality Among Third-Trimester Pregnant Women Before Effleurage Massage Using Lavender Oil

The pretest measurement using the Pittsburgh Sleep Quality Index (PSQI) showed that most respondents had impaired sleep quality before receiving effleurage massage using lavender oil. Of the 30 third-trimester pregnant women included in this study, 26 respondents (86.7%) were categorized as having poor sleep quality, while one respondent (3.3%) had very poor sleep quality. This finding indicates that sleep disturbance was a dominant complaint among the respondents before the intervention.

This result is consistent with previous evidence showing that poor sleep quality is common during pregnancy and tends to increase as gestational age advances. A systematic review and meta-analysis reported that the prevalence of poor sleep quality increased from 37.46% in the first trimester to 60.05% in the third trimester (Mislu et al., 2024). A multicenter study also found that poor sleep quality was more frequent in the third trimester than in earlier trimesters. Complaints related to back pain, dyspnea, nocturia, fetal movement, abdominal pressure, and fear of childbirth became increasingly prominent toward late pregnancy (Banaei et al., 2025).

Based on these findings, the sleep disturbances experienced by respondents in this study should not be interpreted as primary insomnia. Rather, they may be understood as consequences of the anatomical, physiological, and psychological changes that occur during late pregnancy. Uterine enlargement increases pressure on the bladder, leading to nocturia and repeated nocturnal awakenings. In addition, postural changes, increased lumbar load, and an anterior shift in the maternal center of gravity may increase lower back muscle tension and discomfort. These conditions may interfere with both sleep initiation and sleep maintenance.

Respondent characteristics may also help explain the poor sleep quality observed during the pretest. Most respondents were housewives (63.3%), and more than half were multigravida (56.7%). This finding suggests that many respondents had to manage pregnancy-related physical changes while simultaneously performing domestic responsibilities and caring for previous children. Repetitive household activities, such as cooking, cleaning, washing, and

childcare, may contribute to cumulative muscle fatigue. Although these activities may still be tolerated during the day, the resulting discomfort may become more apparent at night when the body is at rest.

This condition was reflected in the relatively prolonged sleep latency observed before the intervention. Several respondents required more than 30 minutes to fall asleep despite experiencing physical fatigue. This pattern suggests that fatigue alone does not guarantee adequate sleep when it is accompanied by musculoskeletal discomfort, psychological tension, and repeated nocturnal disturbances. These findings support the need for safe and feasible non-pharmacological interventions to reduce discomfort and improve sleep readiness among third-trimester pregnant women.

Sleep Quality Among Third-Trimester Pregnant Women After Effleurage Massage Using Lavender Oil

After three regular sessions of effleurage massage using lavender oil, a clear improvement in sleep quality was observed. The posttest results showed that 27 respondents (90.0%) achieved good sleep quality. The mean global PSQI score also decreased from 9.87 before the intervention to 6.33 after the intervention, indicating an improvement in overall sleep quality.

The most noticeable improvements were observed in sleep duration and sleep latency. Before the intervention, most respondents slept for only five to six hours per night. After receiving the intervention, approximately 80.0% of respondents were able to sleep for six to seven hours per night. During late pregnancy, even a modest increase in sleep duration may be clinically meaningful because maternal fatigue tends to increase as delivery approaches. Sleep latency also improved, as more than half of the respondents were able to fall asleep within less than 15 minutes after receiving regular massage sessions.

This positive response may be explained by the dual mechanism of the intervention. From a biomechanical perspective, slow and rhythmic effleurage massage applied to the back may reduce muscle tension, improve local circulation, and promote relaxation. A systematic review of randomized controlled trials reported that massage during pregnancy may reduce stress, back pain, leg pain, depression, and anxiety while improving maternal comfort when performed with appropriate precautions (Mueller & Grunwald, 2021). Similarly, effleurage massage combined with lavender essential oil aromatherapy was found to significantly reduce lower back pain among third-trimester pregnant women (Lestari et al., 2022).

Lavender oil may provide an additional relaxing effect through neurophysiological pathways. Lavender contains linalool and linalyl acetate, which are associated with anxiolytic, sedative, and relaxing effects. These components may influence the central nervous system through olfactory stimulation and limbic system pathways, particularly in areas involved in emotional regulation and arousal. A systematic review and meta-analysis showed that aromatherapy can improve anxiety and sleep quality among women during pregnancy and other maternal periods (Wang et al., 2025). A comprehensive review also reported that the anxiolytic effects of *Lavandula angustifolia* are mainly associated with its linalool and linalyl acetate content (Manzoor et al., 2025).

However, not all respondents demonstrated the same degree of improvement. Three respondents (10.0%) remained in the poor sleep quality category after the intervention. Based on follow-up observations and anamnesis, this condition appeared to be influenced by less supportive sleep environments, including high room temperatures and noise around the home. Psychological factors also contributed to the residual sleep disturbances. Two respondents reported considerable anxiety before delivery, particularly in relation to limited partner support. Pregnancy-related anxiety and fear of childbirth have been independently associated with poorer sleep quality during pregnancy (Banaei et al., 2025). Therefore, when sleep disturbances

are strongly influenced by psychological stress, touch-based interventions alone may be insufficient. Additional counseling, partner involvement, and emotional support should be integrated into comprehensive antenatal care.

The Effect of Effleurage Massage Using Lavender Oil on Sleep Quality Among Third-Trimester Pregnant Women

The hypothesis test using the Wilcoxon signed-rank test produced an *Asymp. Sig. (2-tailed)* value reported as .000, which should be interpreted as $p < .001$. This result indicates a statistically significant difference in sleep quality before and after the intervention. Therefore, effleurage massage using lavender oil had a significant effect on improving sleep quality among third-trimester pregnant women in this study.

The observed improvement may be associated with the physiological effects of massage on pain modulation, muscle relaxation, and stress reduction. Massage may influence the hypothalamic–pituitary–adrenal axis and sympathetic nervous system, thereby reducing physiological stress responses and supporting relaxation (Shi & Wu, 2023). Effleurage massage provides gentle tactile stimulation that may reduce musculoskeletal discomfort, particularly lower back tension, which is a common sleep-disrupting complaint during late pregnancy.

The effects of effleurage massage on pain and comfort may also be explained through the gate-control mechanism. Gentle touch and pressure stimulate large-diameter A-beta fibers, which transmit impulses more rapidly than nociceptive C fibers. This stimulation may inhibit pain transmission at the spinal cord level before nociceptive signals reach the brain. Consequently, the perception of back pain and muscular discomfort may decrease, allowing the body to enter a more relaxed state that facilitates sleep initiation (Shi & Wu, 2023).

Further analysis of the PSQI components supports this interpretation. The item measuring sleep disturbance caused by bodily pain showed a marked reduction, with the mean score decreasing from 2.70 before the intervention to 1.33 after the intervention. This finding suggests that the intervention reduced pain-related sleep disturbances. In contrast, the nocturia score remained unchanged at 2.67 before and after the intervention. This result indicates that effleurage massage may effectively reduce muscle tension and pain but does not directly address nocturia, which is primarily caused by mechanical pressure from the enlarging uterus and fetal head on the bladder during late pregnancy.

Cross-tabulation also showed that high intervention effectiveness was found only among respondents who were housewives. This pattern may be related to their daily activity profiles. Continuous domestic activities, including washing, cooking, cleaning, and childcare, may produce greater cumulative muscle fatigue. When relaxation massage was administered, respondents with greater muscle fatigue may have experienced a stronger recovery response than those with more static or less physically demanding activity patterns. Employment and housewife status have also been associated with differences in sleep quality during pregnancy (Banaei et al., 2025).

Overall, the findings support the use of effleurage massage with lavender oil as a complementary, non-pharmacological intervention to improve sleep quality among third-trimester pregnant women. The intervention is simple, feasible, and does not involve pharmacological exposure. Midwives may consider incorporating this intervention into supportive antenatal care at public health centers or independent midwifery practices, particularly for pregnant women experiencing sleep disturbances related to back discomfort, muscle tension, and difficulty initiating sleep.

Nevertheless, because this study used a one-group pretest–posttest design without a control group, the findings should be interpreted with methodological caution. The observed changes cannot be attributed exclusively to the intervention because maturation effects, repeated measurement, environmental changes, and other uncontrolled factors may also have

influenced sleep quality. Future studies should employ randomized controlled or quasi-experimental designs, include larger samples, and assess relevant psychological and environmental factors to strengthen the internal validity and generalizability of the findings.

4. CONCLUSION

This study concluded that effleurage massage using lavender oil, administered for three consecutive days, significantly improved sleep quality among third-trimester pregnant women in the working area of Sukorame Public Health Center, Kediri City. Before the intervention, most respondents experienced poor to very poor sleep quality, whereas after the intervention, the majority improved to the good sleep quality category, although a small proportion still reported poor sleep quality. These findings indicate that effleurage massage using lavender oil may be considered a safe, simple, and feasible non-pharmacological intervention to support maternal comfort and sleep quality during late pregnancy. Midwives and primary health care facilities may integrate this intervention into complementary antenatal care, maternal health education classes, or pregnancy counseling, including by educating husbands or family members to perform the technique safely at home. Future studies are recommended to use probability sampling, stronger research designs such as quasi-experimental or randomized controlled trials, and larger samples to improve generalizability and internal validity. Further research should also consider potential influencing variables, including anxiety, psychological stress, family support, physical activity, sleep hygiene, and environmental factors such as room temperature, lighting, and noise, as well as combine subjective instruments such as the Pittsburgh Sleep Quality Index with objective sleep measurements such as actigraphy, sleep trackers, or polysomnography to obtain more accurate and comprehensive findings.

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