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The Effect of Endorphin Massage on the Sleep Quality of Third-Trimester Pregnant Women

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Abstract:
Sleep disturbances are common among pregnant women, especially in the third trimester, but effective non-pharmacological interventions are still limited. This study aims to analyze the effect of endorphin massage on the sleep quality of pregnant women aged 37–40 weeks. The study design used a pre-experimental one-group pretest–posttest without a control group. A total of 30 respondents were selected through total sampling. Endorphin massage was administered twice, with each session lasting 15–20 minutes. Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). The results showed a change in the PSQI score from a pretest average of 9.3 to 7.8 on the posttest; however, the McNemar test produced a p-value of 1.00 ($p > 0.05$), indicating that there was no statistically significant effect. Clinically, endorphin massage has the potential to enhance sleep quality through its relaxation and endorphin release mechanisms. This study concludes that although not statistically significant, endorphin massage may be considered as a supportive therapy to enhance sleep comfort in pregnant women. Limitations of this study include a small sample size and the absence of a control group; thus, further research with a stronger design is needed.

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INTRODUCTION

Sleep is a fundamental human need that plays a crucial role in maintaining physiological and psychological balance. During sleep, the body undergoes energy restoration, tissue repair, and stabilization of the nervous system (Ramar et al., 2021; Agustina et al., 2022). Adequate and good-quality sleep supports physical health, emotional well-being, and immune function. Conversely, sleep disturbances can lead to metabolic disorders, increased blood pressure, mood instability, and decreased cognitive performance (Jin et al., 2023; Rahmawati et al., 2024). During pregnancy, the need for sleep increases due to physiological changes that demand greater energy expenditure for both the mother and the fetus (Al-Musharaf, 2022).

Pregnancy, particularly in the third trimester, is often accompanied by significant sleep disturbances. Anatomical changes such as uterine enlargement, weight gain, frequent urination, back pain, and fetal movement can disrupt maternal comfort during sleep (Felix & Ceolim, 2023). Hormonally, increased levels of estrogen and progesterone also affect the central nervous system, which regulates sleep patterns (Haufe & Leeners, 2023). These conditions cause pregnant women to wake up frequently at night and have difficulty returning to sleep, resulting in reduced sleep quality.

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Poor sleep quality can lead to chronic fatigue, reduced immunity, and increased risks of pregnancy complications such as hypertension and preterm labor (Polo-Kantola, 2022).

Global data indicate that approximately 78% of pregnant women experience sleep disturbances, with 40% occurring during the third trimester (Moghadam et al., 2021). Prolonged sleep disturbances in pregnant women may increase the risk of obstetric complications, including preeclampsia, prolonged labor, and premature birth (Zhu et al., 2024). In Indonesia, the National Sleep Foundation (2022) reported that more than half of pregnant women experience poor sleep quality (Dwita et al., 2021). According to data from the Kediri District Health Office (2022), the working area of the Kandangan Community Health Center has a relatively high number of pregnant women, most of whom report experiencing sleep disturbances, particularly in the late stages of pregnancy.

Efforts to improve sleep quality in pregnant women can be approached through pharmacological and non-pharmacological methods. Pharmacological therapy, such as the use of sleeping pills, is not recommended due to potential side effects on the fetus (Paulino et al., 2022). Therefore, non-pharmacological approaches are considered safer alternatives. One such therapy that has gained increasing attention is endorphin massage, a gentle massage technique designed to stimulate the release of endorphins. These hormones act as natural analgesics, helping to reduce stress, promote relaxation, and create a sense of comfort, thereby facilitating better sleep (Anggraini et al., 2024; Field, 2024).

Several studies have demonstrated the positive benefits of endorphin massage on the physical and psychological conditions of pregnant women (Baek et al., 2022). Other research has found that endorphin massage effectively reduces the intensity of back pain and enhances relaxation (Sari & Anissa, 2023; Dahlan et al., 2023). Additionally, similar studies have reported that endorphin massage can reduce anxiety levels among third-trimester pregnant women. However, research on the effect of this therapy on the sleep quality of pregnant women remains limited, particularly among populations in Kediri. Therefore, further studies are needed to determine the extent to which endorphin massage can influence the sleep quality of pregnant women in the third trimester (Stenbäck et al., 2024; Subriah et al., 2022).

Based on the above background, this study was conducted to analyze the effectiveness of endorphin massage on the sleep quality of third-trimester pregnant women in the working area of the Kandangan Community Health Center, Kediri Regency. The findings are expected to provide scientific evidence for healthcare professionals, particularly midwives, to deliver comprehensive and safe non-pharmacological care that aims to improve maternal well-being during pregnancy.

METHOD

This study used a one-group pretest–posttest pre-experimental design without a control group. The study obtained ethical approval from the Health Research Ethics Committee of the Malang Ministry of Health Polytechnic, and all participants provided written informed consent prior to data collection. The population in this study consisted of all pregnant women in their third trimester in the working area of the Kandangan Community Health Center. A total of 30 respondents were selected using total sampling based on the following inclusion criteria: gestational age of 37–40 weeks, good general health, and willingness to participate in the entire research process. There was no missing data, so all respondents were included in the analysis.

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI). Sleep quality categorization followed international cutoffs: scores ≤5 was categorized as good sleep quality, while scores >5 were categorized as poor, in accordance with PSQI validation recommendations for both

adult and obstetric populations. The endorphin massage intervention was administered twice, each session lasting 15–20 minutes and covering the back, shoulders, arms, and thighs. The massage was performed by two trained midwives who had undergone standardized training in endorphin massage techniques, as developed by the researchers. Standardization included the sequence of movements, consistent gentle pressure, use of the same massage medium, and written procedure guidelines to minimize technique variation.

To minimize confounding factors, all respondents received uniform instructions: to avoid caffeine consumption for 6 hours before bedtime, to maintain a quiet and dark sleeping environment, and to refrain from strenuous activities in the 6 hours preceding bedtime. Data analysis was performed univariately (frequency distribution) and bivariately using the McNemar test. This test was chosen because it is suitable for paired categorical data (pre-post on the same respondents) to determine changes in sleep quality proportions before and after intervention, with a significance level of $\alpha = 0.05$.

RESULT

Before the endorphin massage intervention, most respondents (70%) had poor sleep quality, as indicated by their PSQI scores. The average PSQI score before the intervention was 9.3 ± 2.1 and decreased after the intervention to 7.8 ± 2.4. Descriptively, this decrease in scores indicates a trend toward improved sleep quality.

Table 1. Changes in Sleep Quality Based on PSQI Categories (n=30)

Sleep Quality	Before intervention (n=30)	After intervention (n=30)	p
Good (≤5)	9 (30%)	12 (40%)	1.00
Poor (>5)	21 (70%)	18 (60%)	
Total	30 (100%)	30 (100%)	

Categorically, the proportion of good sleep quality increased from 30% to 40%. However, the McNemar test yielded a p-value of 1.00 ($p > 0.05$), indicating that there was no significant change in the proportion of sleep quality before and after the intervention. Thus, although there was clinical improvement, the effect was not statistically significant.

Table 2. Average PSQI Score Before and After intervention (n=30)

Variable	Mean ± SD	p
PSQI before	9.3 ± 2.1	1.00
PSQI after	7.8 ± 2.4	
Change (Δ)	–1.5 points	

The results showed that endorphin massage provided a positive clinical trend, characterized by a decrease in PSQI scores and an increase in the number of pregnant women with good sleep quality. However, statistically, there was no significant change ($p = 1.00$), so this intervention cannot be concluded to be effective based on categorical analysis, but it still has the potential to be helpful as a supportive therapy.

DISCUSSION

The results of this study indicate that endorphin massage does not have a statistically significant effect on the sleep quality of pregnant women in their third trimester. However, there was

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an increase in the proportion of individuals with good sleep quality, from 30% to 40%, and a decrease in the average PSQI score, from 9.3 to 7.8, indicating clinical improvement after the intervention. However, statistically, there was no significant change ($p = 1.00$), so this intervention cannot be concluded to be effective based on categorical analysis, but it still has the potential to be helpful as a supportive therapy.

Several factors may influence the lack of significant differences. First, the small sample size ($n = 30$) limited the statistical power to detect meaningful changes. Second, the frequency of intervention, which was performed only twice, may not have been sufficient to produce long-term physiological effects on sleep quality. A study showing significant results generally provided more frequent interventions, for example, 3–5 sessions per week (Anggraini et al., 2024; Subriah et al., 2022). Third, the heterogeneous characteristics of the participants, such as variations in anxiety levels, daily activity patterns, and maternal health conditions, may have influenced the response to massage therapy.

These findings are similar to a study by Stenbäck et al. (2024), which reported an improvement in sleep quality. However, there was no statistical significance after relaxation therapy was administered to pregnant women. However, these results differ from those of studies by Zelharsandy et al. (2024) and Mueller & Grunwald (2021), which showed that endorphin massage significantly reduced anxiety and improved sleep comfort. These differences are likely due to variations in intervention intensity, study designs involving control groups, and more controlled sleep environments in those studies.

Physiologically, endorphin massage works by stimulating the skin's mechanoreceptors through gentle, rhythmic touch. This tactile stimulation activates sensory nerves that send signals to the central nervous system, prompting the release of endorphins and serotonin—neurochemicals closely associated with mood enhancement, relaxation, and pain modulation (Kopf, 2021; Ismarina et al., 2023). Endorphins act as natural analgesics, reducing the perception of pain, while serotonin contributes to feelings of well-being and plays a key role in regulating sleep-wake cycles. The combined effect of these biochemical changes promotes deep physical relaxation and helps calm the nervous system (Iacovides et al., 2021).

By reducing muscle tension, alleviating discomfort, and lowering stress hormone levels such as cortisol, endorphin massage creates optimal conditions for improved sleep quality. Although these subjective benefits may not always result in statistically significant improvements in standardized sleep assessment tools like the Pittsburgh Sleep Quality Index (PSQI), many individuals report enhanced sleep comfort and easier initiation of sleep following treatment. This suggests that while objective polysomnographic or questionnaire-based metrics may not fully capture the therapeutic impact, the clinical and experiential value of endorphin massage in supporting restorative sleep remains meaningful.

CONCLUSION

This study shows that endorphin massage does not produce a statistically significant effect on the sleep quality of pregnant women in their third trimester ($p = 1.00$; $p > 0.05$). However, there was a slight clinical improvement, as indicated by an increase in the proportion of good sleep quality and a decrease in the average PSQI score after the intervention. Endorphin massage remains a potential non-pharmacological supportive therapy to improve comfort and relaxation in pregnant women, primarily when performed more regularly and accompanied by sleep hygiene education. For further research, it is recommended to use a control group to clarify the effects of the intervention, increase the sample size to improve statistical power, extend the duration and frequency of the intervention

to optimize physiological effects, and control for confounding factors such as stress, daily activities, and sleep environment conditions.

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CONFLICT OF INTEREST

There is no conflict of interest in this article.

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