

The Effect Of Prenatal Exercise On Sleep Quality In Pregnant Women During The Third Trimester

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ABSTRACT

Background: Prenatal exercise is believed to enhance third-trimester sleep quality in expectant mothers, promoting physical well-being and preparing them for childbirth. This study aimed to analyze the effect of prenatal exercise on sleep quality in pregnant women during the third trimester.

Methods: This study is quantitative and quasi-experimental, employing a non-randomized one-group pretest-posttest design. This research was conducted at the Marista Sinaga Midwife Practice, Simpang Talas, Siak Regency, Riau Province, in 2024. The research was conducted in June 2024. The subjects of this research were all third-trimester pregnant women who presented for treatment at the Marista Sinaga Midwife Practice; a total of 30 participants were recruited through purposive sampling. The intervention in this study was prenatal exercise. Pre-and posttests assessing sleep quality were administered before and after the prenatal exercise. Sleep quality was measured using a questionnaire. The data analysis stage began with calculating the frequency distribution of respondent characteristics and the mean sleep quality score. Data analysis used a paired t-test because the data were normally distributed.

Results: The average sleep quality score before the intervention was 3.93; after the intervention, through prenatal exercise, it increased to 8.50. Prenatal exercise significantly affected sleep quality in pregnant women in the third trimester ($p = <0.001$)

Conclusion: Prenatal exercise significantly affects sleep quality in pregnant women in the third trimester.

Introduction

Sleep is an important part of human health and a key predictor of physical health. Poor sleep is common during pregnancy and can affect both the mother and the baby (Mislu & Terefe, 2025). Sleep problems, like sleeplessness and poor sleep quality, are common during pregnancy and the time after giving birth. These disturbances are associated with numerous adverse outcomes (Goudini et al., 2025). Inadequate sleep can interfere with everyday tasks and have a negative impact on pregnancy outcomes (Awlachew et al., 2025). There were strong links between pregnant women's poor sleep quality and where they lived, the number of children, the type of pregnancy they were having, their gestational age, having low hemoglobin levels, drinking alcohol in the past month, and drinking coffee after dinner (Mislu & Terefe, 2025). Therefore, physical activity during gestation fosters health advantages for both the mother and the fetus (Gari et al., 2022).

During pregnancy, a woman's body undergoes profound hormonal, physical, and psychological changes that can significantly alter normal sleep patterns. Rising levels of progesterone, while essential for maintaining pregnancy, can contribute to increased daytime sleepiness and nighttime awakenings. Physical discomfort, including back pain, frequent urination, leg cramps, and fetal movements, often

becomes more pronounced as pregnancy progresses, further disrupting rest. Additionally, emotional factors such as anxiety about childbirth, parenting responsibilities, and financial concerns may lead to difficulty falling or staying asleep. These combined influences make sleep disturbances particularly prevalent in the second and third trimesters.

The consequences of poor sleep during pregnancy extend beyond simple fatigue. Chronic sleep deprivation has been associated with impaired immune function, reduced pain tolerance, mood instability, and diminished cognitive performance (Awlachev et al., 2025). Pregnant women experiencing insufficient sleep may report irritability, reduced concentration, and decreased productivity in daily activities. More importantly, poor sleep has been linked to adverse obstetric outcomes, including prolonged labor, gestational hypertension, gestational diabetes, and preterm birth. Sleep disturbances may also increase the risk of prenatal and postpartum depression, which can negatively influence maternal-infant bonding and long-term child development.

Environmental and lifestyle factors play a crucial role in shaping sleep quality during pregnancy. Living conditions, such as overcrowding, noise exposure, and limited access to healthcare services, may increase stress levels and hinder adequate rest. Multiparity, or having multiple children, can reduce opportunities for uninterrupted sleep, especially when caring for young children. Nutritional deficiencies, such as low hemoglobin levels indicative of anemia, can contribute to fatigue and restless sleep (Özkan & Rathfisch, 2018). Substance use, including alcohol consumption and late caffeine intake, may further disrupt normal sleep cycles by affecting the central nervous system and altering circadian rhythms.

Given these challenges, promoting healthy sleep habits during pregnancy is essential. Healthcare providers should routinely assess sleep quality as part of antenatal care and provide education on sleep hygiene practices. Recommendations may include maintaining a consistent sleep schedule, creating a comfortable sleep environment, limiting screen exposure before bedtime, and avoiding stimulants in the evening (Gari et al., 2022). Relaxation techniques such as deep breathing, prenatal yoga, and mindfulness meditation may also help reduce stress and improve sleep onset.

Physical activity during gestation has been widely recognized as a beneficial strategy for improving overall well-being, including sleep quality. Moderate, regular exercise can enhance cardiovascular function, regulate weight gain, reduce musculoskeletal discomfort, and support emotional stability. Engaging in safe, pregnancy-appropriate activities such as walking, swimming, or prenatal stretching can promote deeper and more restorative sleep. Moreover, improved sleep may contribute to better metabolic regulation, lower inflammation, and enhanced fetal growth and development.

Sleep is a critical component of maternal health that significantly influences pregnancy outcomes. Multiple biological, psychological, and environmental factors contribute to sleep disturbances during pregnancy. Addressing these factors through education, lifestyle modification, and supportive prenatal care can help reduce adverse outcomes. By prioritizing sleep and encouraging safe physical activity, healthcare systems can support healthier pregnancies and promote positive outcomes for both mothers and their babies.

Previous studies have shown that exercise during pregnancy improves the quality of women's sleep (Yang et al., 2020). Sleep disturbances are common among women in the perinatal period and adversely affect the overall health of both mother and child. Exercise is a cost-effective and sustainable method for enhancing sleep quality, which can be tailored to individual needs. Pregnant women who participated in exercise programs reported significantly better sleep quality (Choong et al., 2022). Subjective sleep quality, sleep latency, duration, and habitual sleep efficiency, as well as sleep disruptions, daytime dysfunction, and overall sleep quality in pregnant women, were all improved by relaxation exercises (Özkan & Rathfisch, 2018). Although many previous studies have examined physical activity during pregnancy, prenatal exercise is also crucial for improving sleep quality in pregnant women during the third trimester. Therefore, this study aims to examine the effect of prenatal exercise on sleep quality among pregnant women in the third trimester.

METHODS

This study is quantitative and quasi-experimental, employing a non-randomized one-group pretest-posttest design. This research was conducted at the Marista Sinaga Midwife Practice, Simpang Talas, Siak Regency, Riau Province, in 2024. The research was conducted in June 2024. The subjects of this research were all third-trimester pregnant women who presented for treatment at the Marista Sinaga Midwife Practice; a total of 30 participants were recruited through purposive sampling.

The inclusion criteria for the research sample were (1) pregnant women in their third trimester with normal pregnancy conditions, and (2) subjects willing to participate in the pregnancy exercise program regularly during the research. Then, the exclusion criteria were (1) pregnant women in their third trimester with high-risk pregnancies, such as preeclampsia, and (2) pregnant women with previously diagnosed sleep disorders. The dependent variable in this study was sleep quality, measured before and after the intervention. The independent variable was the provision of exercise during pregnancy.

The intervention in this study was prenatal exercise. Pre- and posttests assessing sleep quality were administered before and after the prenatal exercise. Sleep quality was measured using a questionnaire. The data analysis stage began with calculating the frequency distribution of respondent characteristics and the mean sleep quality score. Data analysis used a paired t-test because the data were normally distributed.

Table 1. Respondent Characteristics (n=30)

Variable	F	%
Age		
21-30 years	21	70,0
31-40 years	9	30,0
Education		
Elementary school	2	6,7
Junior high school	8	26,7
Senior high school	17	56,7
Undergraduate	3	10,0
Occupation		
Housewife	14	46,7
Self-Employed	10	33,3
Employee	6	20,0

Table 1 shows that the majority of pregnant women (70%) were aged 21-30 years. The highest educational attainment for pregnant women was high school (56.7%). In terms of occupation, 46.7% of pregnant women worked as housewives.

Table 2 Mean Values and Paired T-Test

Variable	Pregnancy exercise				P value
	Mean	Mean difference	Lower	Upper	
Sleep quality					
Pretest	3,93	-4,56	-4,887	-4,246	<0,001
Posttest	8,50				

The results show that the average sleep quality score before the intervention was 3.93, whereas after the intervention, through prenatal exercise, it was 8.50. Prenatal exercise significantly affected sleep quality in pregnant women in the third trimester ($p = <0.001$) (Table 2).

DISCUSSION

The findings in this study show that providing prenatal exercise significantly affects sleep quality in pregnant women in the third trimester ($p < 0.001$). Previous research has shown significant differences in sleep quality in both the control group (p -value < 0.05) and the intervention group (p -value < 0.05), as indicated by statistical tests (Azward et al., 2021). Other studies indicate that a relaxation training program on a compact disc that you listen to daily for four weeks can improve sleep for pregnant women in the third trimester (Özkan & Rathfisch, 2018).

Pregnant women who frequently experience sleep/wake issues should undergo a thorough assessment. Pregnancy-related sleep disturbances were common, particularly in the third trimester. Rather than sleep-disordered breathing, pregnant women who experienced excessive daytime sleepiness had shorter sleep durations and trouble maintaining sleep (Umeno et al., 2020). People who are pregnant often have trouble sleeping, and this has been linked to serious problems and illnesses for both the pregnant woman and her baby. Nevertheless, the management of sleep problems during pregnancy remains suboptimal. This meta-analysis indicates that physical activity programs can help pregnant women experiencing sleep difficulties. The benefits depend on the participant type, program duration, delivery method, and exercise type (Liu et al., 2025).

Another study shows that yoga is beneficial for the fetus's growth and development and can help pregnant women with small gestational ages feel less anxious (Zhuang et al., 2022). Sleep deprivation and excessive sedentary behavior are common pregnancy symptoms. According to this research, pregnant women already have a higher risk of poor sleep quality and sedentary time, and these problems only get worse during the course of the pregnancy. When comparing self-reported sleep quality and sedentary time during pregnancy, pregnant women who participated in structured, supervised exercise training reported better outcomes than those who received routine prenatal care (Alomairah et al., 2023). Aerobic exercise during pregnancy strengthens the mother-child bond and improves sleep quality in pregnant women. These results could be used to promote frequent low-impact aerobic activity among pregnant women (Shen & Chen, 2021). Having trouble sleeping and feeling depressed are common during pregnancy and can hurt both the mother and the baby (Pauley et al., 2020). Therefore, screening for and counseling for mental health issues during pregnancy can help pregnant women have a better night's sleep, which is especially important given the high prevalence of sleep problems among pregnant women and the strong correlation between these conditions and other psychological symptoms (Bahani et al., 2024).

In addition to structured exercise and relaxation interventions, comprehensive prenatal care should incorporate routine sleep assessments and individualized guidance. Healthcare providers can educate pregnant women about sleep hygiene practices, including maintaining a consistent bedtime routine, limiting caffeine intake, engaging in light stretching before sleep, and creating a comfortable sleep environment. Addressing common physical discomforts—such as back pain, leg cramps, and frequent urination—may also contribute to improved sleep continuity.

Integrating multidisciplinary approaches that combine physical activity, psychological support, and lifestyle counseling may produce more sustainable outcomes. For example, supervised group exercise sessions may not only enhance physical fitness but also foster social support, which can alleviate stress and anxiety. Digital health interventions, such as guided audio relaxation programs or telehealth-based exercise coaching, may increase accessibility for women who cannot attend in-person sessions. The growing body of evidence suggests that prenatal exercise and supportive behavioral interventions are effective, non-pharmacological strategies to improve sleep quality in the third trimester. Given the potential risks associated with untreated sleep disturbances, prioritizing safe physical activity and mental health screening during pregnancy should be considered essential components of maternal healthcare.

CONCLUSION

The conclusion is that prenatal exercise significantly affects sleep quality in pregnant women in the third trimester. During the third trimester, pregnant women are advised to engage in pregnancy-specific exercises to improve sleep quality.

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CONFLICTS OF INTEREST

No conflicts of interest were disclosed by the writers of this work

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