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## **The Effects of Prenatal Yoga on Sleep Quality among Pregnant Women in the Second Trimester at TPMB Boinem**

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### **ABSTRACT**

**Introduction:** Sleep quality is defined as satisfaction with sleep, characterized by the absence of fatigue, restlessness, lethargy, or excessive sleepiness. According to the Indonesian Ministry of Health (2019), 80% of pregnant women in Indonesia experience poor sleep quality. In East Java, 52.85% of pregnant women suffer from sleep disturbances (Rahayu, 2020). A preliminary study of 5 pregnant women in their second trimester showed that 4 (80%) frequently woke up at night due to increased urination, anxiety about childbirth, back pain, and leg cramps, while 1 (20%) reported being able to sleep soundly and comfortably.

**Method:** This study used a pre-experimental, single-group, pre-post test design. The population consisted of 18 pregnant women in their second trimester, and the sample comprised 15 pregnant women in their second trimester. The instrument used was the PSQI (Pittsburgh Sleep Quality Index) questionnaire to assess sleep quality in second-trimester pregnant women.

**Result:** The mean sleep quality score before prenatal yoga was 13.20, with a standard deviation (SD) of 7.43 and a standard error (SE) of 1.818; the mean sleep quality score after prenatal yoga was 4.80, with an SD of 1.568 and an SE of 0.405. The paired t-test yielded a p-value of  $0.000 < \alpha 0.05$

**Conclusion:** Prenatal yoga can improve sleep quality. Moving forward, it is hoped that the general public will begin to recognize prenatal yoga as an alternative way to maintain the physical and mental health of pregnant women, particularly in improving sleep quality and reducing discomfort during pregnancy.

**Keywords:** *Sleep Quality; Prenatal Yoga; Second-Trimester Pregnant Women*

### **Introduction**

Pregnancy is one of the phases of a woman's life cycle. Pregnant women may feel uncomfortable due to the anatomical changes that occur during pregnancy as the fetus grows in the uterus. These changes include physiological, biochemical, and emotional changes. Pregnancy can make it difficult for women to sleep due to the physiological and anatomical changes that occur. 58% of pregnant women experience sleep problems

such as increased daytime sleepiness, waking up three to five times each night, and having nightmares (Andarini & Khalifatunnisak, 2024). One of the best forms of exercise during pregnancy is prenatal yoga; when practiced regularly, it can help alleviate the complaints of pregnant women and harmonize the body, mind, and spirit. Yoga can also be considered a beneficial non-pharmacological treatment method because it harmonizes the body, psychology, emotions, and physical reactions of pregnant women (Sa'diah & Darmi, 2024).

In Indonesia, 80% of pregnant women experience poor sleep quality (Indonesian Ministry of Health, 2019), and 52.85% in East Java suffer from sleep disorders (Rahayu, 2020). Sleep disorders are one of the most common problems experienced by pregnant women. During the second trimester, most pregnant women experience sleep problems, and only 1.9% of them wake up at night (Dhea et al., 2023). Based on a preliminary study conducted on 5 pregnant women in their second trimester at the Boinem Maternity and Child Health Clinic from December 23, 2024, to December 26, 2024, using the PSQI (Pittsburgh Sleep Quality Index) questionnaire to measure sleep quality, the results showed that 4 women (80%) frequently woke up at night due to increased urinary frequency, anxiety regarding childbirth, back pain, and leg cramps, which disrupted their sleep quality; and 1 woman (20%) reported sleeping soundly and comfortably. None of these pregnant women had ever practiced prenatal yoga. Factors contributing to sleep disturbances in pregnant women during the second trimester include an enlarged abdomen, back pain, leg cramps, frequent urination, anxiety, uncomfortable sleeping positions, and increased levels of progesterone, which can disrupt a woman's sleep patterns, causing her to wake up easily, have difficulty falling asleep, experience vivid dreams, and suffer from sleep apnea or snoring. Elevated progesterone levels reduce muscle tone, including that of the bladder muscles.

As a result, the urge to urinate at night disrupts sleep, leading to sleep deprivation in second-trimester pregnant women (Sa'diah & Darmi, 2024). Yoga, a form of physical and mental exercise, is highly beneficial for pregnant women, especially during the second trimester, to improve joint flexibility and calm the mind. Blood flow becomes smoother, allowing red blood cells carrying oxygen to the brain to circulate more easily, so the body feels fresher and calmer. Backaches also decrease, helping mothers sleep

more soundly and rest (Ariyanti, 2020). All yoga movements in the body begin by creating an intrinsic sense of relaxation. This gradually leads to a deeper state of relaxation that allows for the release of muscle tension. As the body begins to relax, it takes deeper, more relaxed breaths, which allows for calmer breathing. Slowing the breathing rate allows the heart rate to slow down, helping the entire circulatory system and the heart to relax and feel refreshed. The sympathetic nervous system, which is always ready for action, receives signals to relax, and the parasympathetic nervous system responds (Arlym et al., 2024).

The impact of sleep disturbances on pregnant women in the second trimester can lower immunity and make them emotionally unstable; these disturbances can also lead to depression and stress. This condition disrupts fetal blood circulation, increasing the likelihood of low birth weight and fetal health complications. Pregnant women in the third trimester also experience sleep problems due to anxiety, which results in poor sleep quality (Malinda, 2024).

Solutions to reduce complications in pregnant women The Indonesian government has implemented initiatives, one of which is to address the challenges faced by pregnant women, such as incorporating activities and exercises into the KIA (Maternal and Child Health) handbook. Pregnant women can perform warm-up exercises, Kegel exercises, prenatal exercise, or prenatal yoga. Such activities can help pregnant women indirectly reduce their sleep difficulties (Indonesian Ministry of Health, 2020). Because it has fewer side effects than pharmacological methods, prenatal yoga, as a non-pharmacological method, is an appropriate choice (Dhea et al., 2023). Prenatal yoga can be offered to pregnant women in their second trimester; sessions are held four times over a two-week period, each lasting 30 minutes and consisting of pranayama, a warm-up, core exercises, and a cool-down (Yesie Aprillia, 2020).

## **Method**

This study used a pre-experimental design with a one-group pretest-posttest design. The research was conducted at the Boine Ajung Maternal and Child Health Clinic (TPMB). The study period ran from August 2024 to May 2025. The respondents

in this study consisted of 15 pregnant women in second trimester at the Boineem Midwife Maternal and Child Health Clinic (TPMB).

## Results

Table 1. Frequency Distribution by Parity Among Pregnant Women in the Second Trimester

Parity	Frequency (f)	Percentage (%)
Nulliparous	5	33.3
Primiparous	4	26.7
Multiparous	6	40
Total	15	100

Source : Primary Data, 2025

Table 1 shows that there were 5 nulliparous respondents (33.3%), 4 primiparous respondents (26.7%), and 6 multiparous respondents (40%).

Table 2. Distribution of Respondents Based on Abdominal Cramps in Pregnant Women in the Second Trimester

Stomach Cramps	Frequency (f)	Percentage (%)
Yes	3	20
No	12	80
Total	15	100

Source : Primary Data, 2025

Based on Table 2, 3 respondents (20%) in their second trimester of pregnancy experienced abdominal cramps, while 12 respondents (80%) did not.

Table 3 Distribution of Frequency Based on the Presence or Absence of Lower Abdominal and Thigh Pain in Pregnant Women in the Second Trimester

Frequency of Urination	Frequency (f)	Percentage (%)
Yes	1	6.7
No	14	93.3
Total	15	100

Source : Primary Data, 2025

Based on Table 3, 1 respondent (6.7%) reported discomfort and pain in the lower abdomen and thighs, while 14 respondents (93.3%) experienced no discomfort or pain in the lower abdomen and thighs.

Table 4. Frequency Distribution of Uncomfortable Shortness of Breath in Pregnant Women in the Second Trimester

Short of Breath	Frequency (f)	Percentage (%)
Yes	1	6.7
No	14	93.3
Total	15	100

Source : Primary Data, 2025

Table 4 shows that 1 respondent (6.7%) reported experiencing shortness of breath, while 14 respondents (93.3%) did not report experiencing shortness of breath.

Table 5. Frequency Distribution of Nausea in Pregnant Women in the Second Trimester

Nausea	Frequency (f)	Percentage (%)
Yes	2	13.3
No	13	86.7
Total	15	100

Source : Primary Data, 2025

Based on Table 5, 2 respondents (13.3%) experienced nausea, while 13 respondents (86.7%) experienced no nausea.

Table 6. Frequency Distribution of Hand and Foot Cramps in Pregnant Women in the Second Trimester

Cramps in the Hands and Feet	Frequency (f)	Percentage (%)
Yes	1	6.7
No	14	93.3
Total	15	100.0

Source : Primary Data, 2025

Table 6 shows that 1 respondent (6.7%) reported discomfort from hand and foot cramps, while 14 respondents (93.3%) did not experience such discomfort.

Table 7. Frequency Distribution of Frequent Urination at Night Among Pregnant Women in the Second Trimester

Frequent Urination at Night	Frequency (f)	Percentage (%)
Yes	15	100
Total	15	100

Source : Primary Data, 2025

The table 7 shows that 15 respondents (100%) reported experiencing discomfort due to frequent urination at night.

Table 8. Frequency Distribution of Back Pain in Pregnant Women in the Second Trimester

Back Pain	Frequency (f)	Percentage (%)
Yes	10	66.7
No	5	33.3
Total	15	100

Source : Primary Data, 2025

According to Table 8, 10 respondents (66.7%) reported experiencing back pain, while the other 5 respondents (33.3%) did not experience back pain

Table 9. Frequency Distribution of Discomfort Due to Sleep Position in Pregnant Women in the Second Trimester

Sleep Position Disorder	Frequency (f)	Percentage (%)
Yes	13	86.7
No	2	13.3
Total	15	100

Source : Primary Data, 2025

According to Table 9, the majority of respondents experienced sleep position disturbances, with 13 respondents (86.7%)

Table 10. Frequency Distribution of Respondents' Sleep Quality in the Second Trimester Before Prenatal Yoga

Sleep Quality Score	N (%)	Mean	SD	SE
Score 1 – 5	2 (13,3%)	13,20	7,43	1,818
Score 6 - 21	13 (86,7%)			
Total	15 (100%)	13,20	7,43	1,818

Source : SPSS data 2025

Table 10 shows that the majority of respondents had low quality of sleep (scores of 6–21) before participating in prenatal yoga, specifically 13 respondents (86.7%). Meanwhile, there were 2 respondents (13.3%) who had good sleep quality with a score of 1–5, with a mean of 13.20, a standard deviation of 7.43, and a standard error of 1.818.

Table 11. Frequency Distribution of Sleep Quality Among Second-Trimester Respondents After Prenatal Yoga

Sleep Quality Score	N (%)	Mean	SD	SE
Score 1 – 5	12 (80.0%)	4,80	1,568	0,405
Score 6 - 21	3 (20.0%)			
Total	15 (100%)	4,80	1,568	0,405

Source : SPSS data 2025

Table 11. showing that almost all respondents, after participating in prenatal yoga, had good sleep quality with a score of 1–5, totaling 12 respondents (80%), while respondents who had not experienced any change or had low sleep quality with a score of 6–21 totaled 3 respondents (20%). Results: Mean 4.80, Standard Deviation 1.568, Standard Error

0.405.

Table 12. Distribution of Sleep Quality Changes Before and After Prenatal Yoga

Sleep Quality	Mean	SD	SE	<i>p-value</i>	$\alpha$
Before	13,20	7,43	1,818	0,000	0,05
After	4,80	1,568	0,405	0,000	0,05

Source : SPSS data 2025

Table 12 showed that before prenatal yoga was practiced, the mean was 13.20, the standard deviation was 7.43, and the standard error was 1.818; after prenatal yoga was practiced, the mean was 4.80, the standard deviation was 1.568, and the standard error was 0.405. The Normal Distribution Test was conducted using the Shapiro -Wilk test, the results showed a p-value of 0.207 for the pretest and 0.097 for the posttest  $> \alpha$  0.05, meaning the data is normally distributed; therefore, the statistical analysis used was the paired-sample t-test, yielding a p-value of  $0.000 < \alpha$  0.05, which indicates that prenatal yoga can improve the sleep quality of pregnant women.

## Discussion

The sleep quality of pregnant women in their second trimester Before prenatal yoga was introduced, the majority of respondents reported poor sleep quality. This was due to several factors, including the mother's parity history, physiological and psychological changes during pregnancy, discomfort with sleeping positions, abdominal cramps, and in some cases, shortness of breath. According to research (Zaini Miftach, 2018), parity influences poor sleep quality in pregnant women. Parity refers to the number of previous pregnancies that reached the gestational age of viability the point at which the fetus has a chance of survival outside the womb without accounting for the number of babies born. The condition of pregnant women classified as multigravida those who have been pregnant more than once can affect sleep quality during pregnancy. Pregnant women with previous children are not only responsible for their own health but also for the care of their children. This becomes more complex if the

children being cared for are still young and highly emotionally dependent on their mother's presence. Such circumstances can lead to physical and mental exhaustion in the mother, resulting in reduced rest time, particularly at night. In addition, sleep disturbances often occur because mothers must wake up to attend to their children's needs. This situation can lead to ongoing physical and mental fatigue, thereby reducing the amount and quality of a mother's rest, especially at night. Therefore, high parity has the potential to be a significant factor influencing the sleep quality of pregnant women, not only due to the physiological changes of pregnancy but also because of the caregiving responsibilities that add to physical and psychological stress.

Furthermore, abdominal cramps, as well as hand and foot cramps, are also factors affecting the sleep quality of pregnant women. According to research (Natalia & Handayani, 2022), cramps in pregnant women are generally caused by several physiological factors that occur as a response to bodily changes during pregnancy. One cause is impaired blood circulation in the pelvic blood vessels, which occurs due to pressure from the enlarging uterus. Blood vessels in the pelvic area can become compressed, leading to impaired blood flow and causing discomfort that results in cramps. Additionally, electrolyte imbalances—such as increased phosphate levels and decreased calcium levels in the blood—also contribute to muscle cramps, including those in the abdomen or legs. Decreased calcium levels during pregnancy often result from reduced plasma albumin concentration, which plays a role in transporting calcium in the bloodstream. The decrease also reflects impaired maternal calcium homeostasis, as the developing fetus requires a significant amount of calcium for bone and organ growth. Abdominal cramps, resulting from impaired blood circulation in the pelvic area and electrolyte imbalances—particularly a drop in blood calcium levels—can cause discomfort that disrupts sleep, especially at night when the body should be resting optimally.

It is not uncommon for women in their second trimester of pregnancy to experience shortness of breath, although the prevalence is not always high and may vary depending on the individual condition of each pregnant woman. This is because the growing fetus pushes the diaphragm upward, disrupting its function in the respiratory process, which results in reduced maternal oxygen levels. Meanwhile, pregnancy

increases oxygen consumption by 20% and metabolic rate by 15%, which can create a ventilation-perfusion imbalance leading to shortness of breath in pregnant women (Rahmawati et al., 2021).

Other common symptoms experienced by pregnant women include nausea and frequent urination. Pregnant women often experience nausea due to the role of hCG as the primary cause of nausea in the first trimester; the persistence of nausea into the second trimester can be explained by a combination of other hormonal factors (such as estrogen and progesterone), individual sensitivity, and other physiological and psychological factors. Based on these results, the researchers concluded that a small proportion of respondents still experienced nausea during the second trimester of pregnancy. The researchers noted that although the prevalence is low, the presence of nausea symptoms during this trimester remains important to monitor (Sukeningsih et al., 2021). This suggests that not all pregnant women achieve complete hormonal adaptation after the first trimester. In line with the opinion of Sukeningsih et al. (2021), nausea persisting into the second trimester is likely caused by a complex combination of hormonal factors, such as increased levels of estrogen and progesterone, as well as individual factors like sensitivity to physiological changes and the mother's psychological condition. Thus, persistent nausea may serve as an indicator that the mother is experiencing a more sensitive bodily response to pregnancy-related changes. This condition, although uncommon, has the potential to disrupt the mother's comfort, including aspects of rest and sleep quality.

Complaints of discomfort due to frequent urination at night can also affect rest and sleep for pregnant women in the second trimester. According to research (Purba, 2023), physiological changes during pregnancy, including in the urinary system, lead to various bodily adaptations. One of these is an increase in renal plasma flow of up to 50%, which results in an increased glomerular filtration rate. This leads to more frequent urination in pregnant women. This leads to more frequent urination in pregnant women. This increase in plasma volume also causes hemodilution, making fluid metabolism more efficient and increasing urine production. In addition, frequent urination at night is also common. This is caused by poor venous return when pregnant women stand or remain in an upright position throughout the day, which can hinder

urine output. When lying down at night, venous blood flow becomes smoother, accompanied by a slight increase in sodium levels, which stimulates urine production. Consequently, pregnant women often wake up at night to urinate, which can disrupt their sleep quality.

The other physiological changes experienced by pregnant women include frequent back pain. According to research (Fenny et al., 2024), pregnancy-related lower back pain is defined as recurrent pain lasting more than one week during pregnancy. Lower back pain during pregnancy usually begins in the second trimester (on average at the 22nd week of pregnancy) and continues into the following trimester; however, it can also occur as early as the first week of the second trimester. As the pregnancy progresses, the intensity of back pain typically increases. This occurs as a result of a shift in the body's center of gravity and changes in posture or body shape. Improper posture can cause muscle strain, leading to rapid fatigue in the spine and ultimately resulting in lower back pain during pregnancy. In addition to shifts in the center of gravity and body shape, hormonal changes during pregnancy can cause issues in the musculoskeletal system and disrupt the stability of the spine and sacroiliac joints. During pregnancy, the hormone relaxin—secreted by the placenta—functions to loosen the pelvic ligaments and the ligaments supporting the spine, thereby contributing to lower back pain (Xue et al., 2021).

The results of the general data indicate that 13 respondents (86.7%) experienced sleep position disturbances. According to research (Fenny et al., 2024), changes in body posture due to uterine enlargement and weight gain cause muscle tension, back pain, and pressure on major blood vessels during sleep, especially if the sleeping position is improper. This results in uncomfortable sleep, frequent awakenings, and difficulty maintaining a single position for extended periods. This condition disrupts normal sleep architecture, particularly the deep sleep phase (NREM 3), preventing mothers from achieving the restorative sleep necessary for physical recovery. In addition, this discomfort can lead to stress and hyperarousal, which further worsens sleep quality. Thus, sleep position disturbances directly contribute to poor sleep quality in pregnant women in their second trimester.

Based on these results, the researchers concluded that this issue is very common among pregnant women in their second trimester. This finding aligns with the theory that changes in body posture due to uterine enlargement and weight gain cause muscle tension and pressure on major blood vessels during sleep, leading to discomfort and frequent awakenings. These disturbances result in sleep fragmentation and hinder the attainment of deep sleep phases, which are essential for physical recovery. Additionally, this physical discomfort can increase stress and hyperactivate the nervous system, thereby worsening overall sleep quality.

The sleep quality of pregnant women in the second trimester after participating in Prenatal Yoga at TPMB Boinem has a positive impact on rest and sleep. This occurs because Prenatal Yoga helps mothers relax more deeply and feel more refreshed. Physiologically, relaxation shifts autonomic nervous system activity from the sympathetic to the parasympathetic nervous system. In addition, prenatal yoga is also beneficial for improving blood circulation, enhancing balance and muscle strength, reducing muscle spasms or cramps, alleviating back pain, and reducing shortness of breath (Aulya et al., 2024). Based on these results, the researchers concluded that the improvement in sleep quality among the majority of respondents (80%) indicates that the interventions implemented, such as prenatal yoga, have a positive impact on the sleep comfort of pregnant women in the second trimester. This aligns with the theory proposed by Aulya et al. (2024), that prenatal yoga plays a crucial role in reducing physical discomfort caused by physiological changes during pregnancy, such as back pain, muscle cramps, and respiratory issues. Physiologically, the relaxation achieved through prenatal yoga practice can shift the activity of the autonomic nervous system from sympathetic dominance toward parasympathetic activity, which serves to calm the body. This shift can reduce stress and anxiety levels, as well as facilitate deeper and higher-quality sleep. The mean score of 4.80 also indicates that most pregnant women experienced benefits from this activity regarding their sleep patterns. Thus, the researchers concluded that prenatal yoga can improve sleep quality in pregnant women in the second trimester. Based on this, the researchers concluded that prenatal yoga can improve sleep quality in pregnant women in their second trimester. Thus, these findings

provide empirical support for the idea that prenatal yoga can serve as a non-pharmacological strategy to improve sleep quality during pregnancy.

## Conclusion

Prenatal yoga can serve as a non-pharmacological strategy to improve sleep quality during pregnancy and should be promoted to the general public, particularly to pregnant women, to help them achieve optimal rest and sleep quality.

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