# The Effectiveness of Prenatal Yoga on Improving Sleep Quality of Pregnant Women in The Third Trimester: A Quasi Experimental Study at Bah Kapul and Simarimbun Health Centres, Pematangsiantar City

Parmiana Bangun[1*], Yeyen Damanik[1]

[1.1]Politeknik Kesehatan Kementerian Kesehatan Medan, Pematang Siantar, Indonesia

Email correspondence: parmianabangun83@gmail.com

***Abstract***

*Disturbances in sleep are common among pregnant women, especially in the third trimester, and can negatively impact the health of both the mother and fetus. Non-pharmacological approaches, such as prenatal yoga, offer a safe and effective way to improve sleep quality. This study aims to evaluate the effectiveness of prenatal yoga in enhancing sleep quality, blood pressure, and breathing among pregnant women in the third trimester in the Bah Kapul and Simarimbun Health Centre areas, Pematangsiantar City. A quasi-experimental design was employed, with an intervention group (n = 30) and a control group (n = 30). The intervention group participated in prenatal yoga sessions lasting 60 minutes, three times a week, for eight weeks (minimum 12 sessions). Sleep quality and disturbance were measured using a dedicated assessment tool, and data analysis was conducted with SPSS. Results showed that prior to the intervention, most participants in both groups reported poor sleep quality. After the intervention, significant improvements were observed in the intervention group (p < 0.001), including a reduction in severe sleep disturbances from 6.7% to 0%. The median sleep quality score increased by 1 point in the intervention group, compared to no change in the control group (p = 0.010), while the sleep disturbance score decreased by a median of 4 points in the intervention group (p = 0.019). No significant changes were found in blood pressure or breathing (p > 0.05). The study received ethical approval from the Health Research Ethics Committee of Politeknik Kesehatan Kemenkes Medan (Reference No: 01.26.696 /KEPK/POLTEKKES KEMENKES MEDAN 2024), and written informed consent was obtained from all participants. In conclusion, prenatal yoga significantly improved sleep quality and reduced sleep disturbances in pregnant women in the third trimester and is recommended as part of the antenatal care program at health centers.*

***Keyword: Prenatal Yoga, Pregnant Women, Sleep Disorders, Sleep Quality, Third Trimester.***

## INTRODUCTION

Pregnancy is a natural physiological process in humans, beginning at conception and continuing until the birth of the fetus. Throughout this period, the maternal body undergoes significant physical and psychological changes (Mayoh, 2019; Patrick, 2023). If these physiological changes are not well understood or properly managed, they may lead to discomfort that disrupts the pregnancy, childbirth, and postpartum experience. Common physical symptoms include leg cramps, respiratory difficulties, back pain, and frequent urination, while psychological challenges may manifest as depression, stress, anxiety, and sleep disturbances such as insomnia or difficulty initiating sleep (Pratiwi et al., 2021; S. Wulandari & Wantini, 2021).

Globally, sleep disturbances during pregnancy are a significant concern. The National Sleep Foundation (2017) reports that over 70 million individuals in the United States suffer from sleep disorders, with women experiencing sleep loss more frequently than men, and prevalence increasing with age. Notably, approximately 78% of American women report sleep difficulties during pregnancy compared to their non-pregnant state (Azward et al., 2021; Knutson et al., 2017). In Asia, studies indicate similarly high prevalence rates: 57% among third-trimester pregnant women in Malaysia, and up to 65% in Thailand. In Indonesia, recent findings suggest that over 60% of women in their third trimester experience sleep disturbances, with symptoms intensifying as gestational age advances (Elviyanti et al., 2024; Indrianingrum, 2020).

Prenatal yoga is widely recognized for its potential to alleviate discomfort during pregnancy, particularly in the third trimester, by fostering a calm environment and preparing the body physically. It cultivates maternal awareness of bodily changes, strengthening communication and emotional bonding with the baby (Gustina & Nurbaiti, 2020; Hanafie Das et al., 2022; Kluny & Dillard, 2022). Prenatal yoga integrates stretching, movement, meditation, breathing techniques, endurance, balance, and mindfulness practices. Breathing exercises enhance oxygen distribution, promoting mental tranquility and optimizing oxygen reserves. Specific yoga movements have also been shown to facilitate faster sleep onset and longer sleep duration among individuals experiencing insomnia (Holden et al., 2019; Nadholta et al., 2024; Nurhayati et al., 2024). By stimulating the nervous system and improving blood circulation to the hypothalamus, a key regulator of sleep, yoga helps normalize the sleep cycle. Pregnant women are advised to practice yoga two to three times per week, with sessions lasting 60 to 90 minutes (Shah et al., 2022). Regular practice contributes to improved physical and psychological well-being, enhancing the ability to cope with the challenges of pregnancy.

The findings of this study are consistent with international research. For example, Azward et al. (2021) that prenatal yoga enhances sleep quality among third-trimester pregnant women. In their quasi-experimental study involving 60 participants, the intervention group practiced yoga four times over two weeks, resulting in significant improvements in sleep quality as measured by the Pittsburgh Sleep Quality Index (PSQI) (Azward et al., 2021). Similarly, .Shamabadi et al., (2023) conducted a randomized clinical trial with 98 participants and found that six mindfulness training sessions over two months significantly improved sleep quality (p < 0.05) and reduced anxiety, tension, and melancholy (p < 0.05). These findings support mindfulness as an effective non-pharmacological strategy for enhancing the psychological well-being of pregnant women.

The study by Ibrahim & Zilhijah (2025) examined the impact of prenatal moderate yoga on anxiety levels among third-trimester pregnant women. Using a quasi-experimental design with 24 participants, the researchers found a significant reduction in anxiety levels following four weeks of biweekly light yoga sessions. Anxiety was assessed using the Pregnancy Related Anxiety Questionnaire-Revised (PRAQ-R2), indicating that prenatal yoga effectively alleviates anxiety symptoms (Ibrahim & Zulhijjah, 2025). Similarly, research by Makhijah et al. (2021) demonstrated that participants engaging in integrated yoga experienced significant reductions in both systolic and diastolic blood pressure compared to the control group. The intervention group showed an average decrease of 7.43 ± 5.86 mmHg in systolic blood pressure, while the control group recorded a smaller reduction of 2.50 ± 5.21 mmHg (p = 0.002). Diastolic blood pressure also declined more substantially in the intervention group, from 92.20 ± 5.02 mmHg to 88.00 ± 3.71 mmHg, compared to the control group (p = 0.001) (Makhija et al., 2021).

The novelty of this study lies in its specific focus on sleep quality during the third trimester of pregnancy, utilizing quantitative and measurable indicators such as sleep disturbance scores and categorical assessments – an approach that remains relatively uncommon, particularly in the Indonesian context. This methodology offers a fresh perspective on non-pharmacological interventions for sleep disturbances among pregnant women. Furthermore, the study evaluates the effectiveness of prenatal yoga within a primary health care setting (Puskesmas) in Pematangsiantar City. While most comparablestudies have been conducted in hospitals or private clinics, this community-based approach provides valuable insights into the integration of yoga as a promotive interventions in primary health care services. The findings support prenatal yoga as a safe and effective non-pharmacological strategy for improving sleep quality in third-trimester pregnant women. Building on this foundation, the present study aims to assess the impact of prenatal yoga on sleep quality and disturbances among pregnant women, with results expected to enhance maternal health and inform the integration of yoga into routine antenatal care within primary health care settings.

**METHODS**

**Study Design**

This research employed a quasi-experimental methodology using a pretest-post-test control group design to evaluate the effects of prenatal yoga on sleep quality, blood pressure, and respiration among third-trimester pregnant women. This design was selected for its suitability in naturalistic settings where randomization may be constrained by ethical or logistical reasons.

The research was conducted within the operational areas of Bah Kapul Health Centre and Simarimbun Health Centre, in Pematangsiantar City.

**Sampel design**

The target population comprised all third-trimester pregnant women residing in the designated health centre areas. A total of 60 participants were recruited and evenly assigned to an intervention group (n=30) and a control group (n=30). The study employed a successive sampling strategy, enrolling participants who met the inclusion criteria until the required sample size was achieved within the specified timeframe. Inclusion criteria were: pregnant women at 28–36 weeks of gestation with singleton pregnancies, physically capable of light activity, free from pregnancy complications, and willing to provide informed consent. Exclusion criteria included: complicated pregnancies (such as cardiovascular disease, pulmonary disease, hypertension, multiple gestations) and participants who delivered before completing the study.

**Research process**

This study involved two groups: an intervention group and a control group, selected through random sampling based on predefined inclusion criteria. All participants were pregnant women at 28 weeks gestation who completed an initial assessment using a standardized questionnaire. The intervention group attended prenatal yoga sessions three times a week for 60 minutes, totaling at least 12 sessions, while the control group participated in a 30-minute session once per week. The intervention was guided by Robert Gagné's information processing theory, which encompasses stages such as motivation, comprehension, retention, and feedback. A posttest was administered at 36 weeks of gestation using the same instrument as the pretest. The research process is illustrated in Figure 1.

**Instrument**

The instrument used to assess sleep quality in this study was the Pittsburgh Sleep Quality Index (PSQI) questionnaire. The PSQI is validated tool designed to measure sleep quality and patterns over the preceding month. According to (Buysse et al., 1989), PSQI categorizes sleep quality into two groups: (a) good sleep quality and (b) poor sleep quality, based on seven components—subjective sleep quality, sleep duration, sleep latency, sleep efficiency, sleep disturbances, daytime dysfunction, and use of sleeping medication. Each item is scored on a Likert scale ranging from 0 to 3, with distinct scoring methods applied to each component. The total score is calculated by summing all component scores, yielding a final classification: scores <5 indicate good sleep quality, while scores >5 indicate poor sleep quality.

To ensure the instrument's appropriateness for this study, validity and reliability testing were conducted. The validity test, performed on 30 respondents, identified 18 valid items suitable for measuring sleep quality, with r count values ranging from 0.365 to 0.733 and a significance threshold of 0.368 (r table < r count). Reliability testing using the Cronbach's alpha method yielded a coefficient of 0.812, indicating high internal consistency.
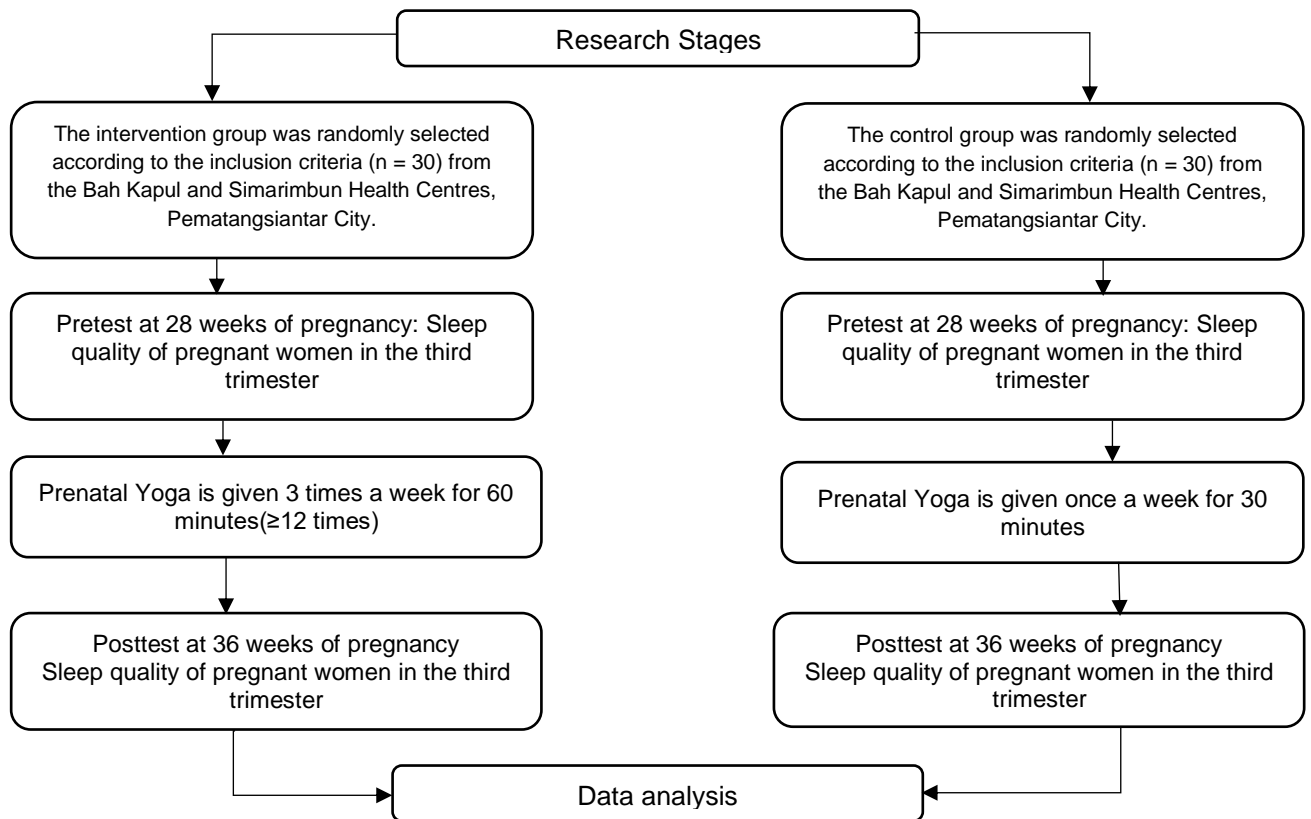
The independent variable in this study was prenatal yoga. Dependent variables included maternal sleep quality in the third trimester, blood pressure, and respiration. Confounding variables were age, education level, employment status, and antenatal care (ANC) attendance.

**Data analysis**

Data processing and analysis were conducted using IBM SPSS software. Univariate analysis was performed to describe respondent characteristics, including age, education, occupation, and antenatal care (ANC) attendance, with categorical data presented as frequency distributions and percentages. Bivariate analysis was used to examine relationships between variables, employing the Mann-Whitney test to compare sleep quality improvements between the intervention and control groups. The chi-squared test was applied to assessthe impact of prenatal yoga on sleep quality across both groups, with statistical significance set at a p-value of less than 0.05.

**Ethics Declaration**

Prior to initiating the study, the researcher obtained ethical approval the Ethic Commission of Politeknik Kesehatan Kementerian Kesehatan Medan (Reference Number: 01.26 696 /KEPK/POLTEKKES KEMENKES MEDAN 2024). Each potential informant and respondent was provided with an informed consent form following a detailed explanation of the study's purpose, objectives, and procedures. The researcher assured participants of the confidentiality of all submitted information and confirmed that the data would be used exclusively for research purposes. Individuals who agreed to participate were asked to sign the consent form, while those who declined had their decision respected, and no further interviews or data collection were conducted.

```
┌─────────────────────────────────────┐
│           Research Stages            │
└─────────────────────────────────────┘
```

| The intervention group was randomly selected according to the inclusion criteria (n = 30) from the Bah Kapul and Simarimbun Health Centres, Pematangsiantar City. | The control group was randomly selected according to the inclusion criteria (n = 30) from the Bah Kapul and Simarimbun Health Centres, Pematangsiantar City. |
|---|---|
| Pretest at 28 weeks of pregnancy: Sleep quality of pregnant women in the third trimester | Pretest at 28 weeks of pregnancy: Sleep quality of pregnant women in the third trimester |
| Prenatal Yoga is given 3 times a week for 60 minutes(≥12 times) | Prenatal Yoga is given once a week for 30 minutes |
| Posttest at 36 weeks of pregnancy Sleep quality of pregnant women in the third trimester | Posttest at 36 weeks of pregnancy Sleep quality of pregnant women in the third trimester |

```
┌─────────────────────────────────────┐
│            Data analysis             │
└─────────────────────────────────────┘
```

## RESULTS

This study was conducted at two Community Health Centres recognized for providing exemplary maternal and child health (KIA) services in  Pematangsiantar City: Bah Kapul Community Health Centre and Simarimbun Community Health Centre in Siantar Marihat District. The research aimed to evaluate the effectiveness of prenatal yoga in improving sleep quality among third-trimester pregnant women. A total of 30 participants were involved, with the intervention group receiving regular prenatal yoga sessions and the control group receiving irregular sessions.

## Characteristics of Research Subjects

The research subjects were divided into two sample groups based on the study's objectives:an intervention group (30 pregnant women) and a control group (30 pregnant women). Participant characteristics recorded included age, education, occupation, blood pressure, respiration, and antenatal care (ANC) attendance. Sleep quality and sleep disturbances were assessed both before and after the intervention, which was administered over a three-month period. The complete results of the study are presented in Table 1.

**Table 1: Characteristics of the Two Treatment Groups**

| Characteristics | Group | | p*value) |
|---|---|---|---|
| | Intervention (n=30) | Control (n=30) | |
| 1. Age (years): | | | |
| <20 | 3 | 6 | 0.499 |
| 20-35 | 18 | 18 | |
| >35 | 9 | 6 | |
| 2. Education: | | | |
| Elementary (≤ Junior High) | 5 | 9 | 0.466 |
| Middle School | 16 | 14 | |
| College/College | 9 | 7 | |
| 3. Work: | | | |
| Not working/housewife | 16 | 22 | 0.108 |
| Work | 14 | 8 | |
| 4. ANC check (times): | | | |
| Median (range) | 5 (4-6) | 4 (4-6) | 0.244 |

**Information :**\*) based on the Chi-square test, except for the ANC examination with the Mann-Whitney test.

Table 1 presents the distribution of research subjects based on age, education level, occupation and antenatal care (ANC) attendanceamong third-trimester pregnant women. In terms of age, the majority of participants in both the intervention and control groups were between 20 and 30 years old, with 18 individuals (5.4%) in each group. Regarding education, most participants had completed high school, totaling 16 individuals (4.8%) in the intervention group and 14 individuals (4.2%) in the control group. In terms of occupation, the majority were housewives (IRT), with 16 participants (4.8%) in the intervention group and 22 participants (6.6%) in the control group. For ANC attendance, the average number of visits was five in the intervention group and four in the control group.

**Table 2. Comparison Results of Blood Pressure and Respiratory Examination in the two research groups**

| Variables | Group | | p*value) |
|---|---|---|---|
| | Intervention (n=30) | Control (n=30) | |
| Before Intervention: | | | |
| Systolic (mmHg) | 120 (100-140) | 115 (100-130) | 0.098 |
| Diastolic (mmHg) | 80 (60-90) | 80 (60-90) | 0.812 |
| Breathing | 22 (20-26) | 22 (18-24) | 0.073 |
| After Intervention: | | | |
| Systolic (mmHg) | 120 (100-120) | 120 (100-120) | 0.274 |
| Diastolic (mmHg) | 80 (70-80) | 80 (70-80) | 1,000 |
| Breathing | 20 (18-22) | 20 (18-22) | 0.863 |

**Information :**\*)based on the Mann-Whitney test; data are presented in median and range.

The table above presents descriptive statistical comparisons of the various variables studied from the two treatment groups, namely, systolic blood pressure, diastolic blood pressure, and respiration before and after treatment was given. The results of statistical tests showed that all variables measured in the two research groups did not show any significant differences (p>0.05). With the homogeneity of the characteristics of the subjects and the measurements of the various variables studied, it is feasible to compare.

**Table 3 Comparison of Sleep Quality Scores Before and After Treatment Given to the Two Research Groups**

| Sleep Quality (Score data) | Group | | p*value) |
| --- | --- | --- | --- |
| | Intervention (n=30) | Control (n=30) | |
| Before intervention: | | | 0.111 |
| Median | 1 | 1 | |
| Range | 1 – 2 | 1 – 2 | |
| After intervention: | | | 0.169 |
| Median | 2 | 2 | |
| Range | 1 – 2 | 1 – 2 | |
| Comparison before vs after intervention | p <0.001**) | p =0.003*) | |
| Sleep Quality Score Increase: | | | 0.010 |
| Median | 1 | 0 | |
| Range | 0 – 1 | 0 – 1 | |

**Information :**\*) based on Mann-Whitney test; \*\*) Wilcoxon test.

Table 2 presents a comparison of sleep quality scores before and after the intervention. Prior to the intervention, the median sleep quality scores in both groups were categorized as poor and showed no significant difference (p > 0.05). Following the intervention, a statistically significant difference was observed between the intervention and control groups (p < 0.05). The intervention group demonstrated an improvement with a median score of 1, while the control group remained at a median of 0. The Mann–Whitney test confirmed that the increase in sleep quality scores was statistically significant (p < 0.05).

Sleep quality was assessed using a categorical scoring system, where a score of 1 indicated poor sleep quality and a score of 2 indicated good sleep quality. Before the intervention, 22 participants (73.3%) in the intervention group and 17 participants (56.7%) in the control group were classified as having poor sleep quality. After the intervention, the number of participants with poor sleep quality decreased to 3 (10%) in the intervention group and 7 (23.3%) in the control group. The comparison of pre- and post-intervention results in both groups showed a statistically significant improvement (p < 0.05).

**Table 4. Comparison of Sleep Quality in the two research groups**

| Sleep Quality (Category) | Group | | p*value) |
| --- | --- | --- | --- |
| | Intervention (n=30) | Control (n=30) | |
| Before intervention: | | | |
| Bad | 22 (73.3%) | 17 (56.7%) | 0.176 |
| Good | 8 (26.7%) | 13 (43.3%) | |
| After intervention: | | | |
| Bad | 3 (10.0%) | 7 (23.3%) | 0.166 |
| Good | 27 (90.0%) | 23 (76.7%) | |
| Comparison before vs after intervention | p<0.001**) | p=0.003**) | |

**Information :**\*) based on Chi-square test; \*\*) Mc.Nemar test.

The table above compares sleep quality before and after the intervention, which was given to both research groups. Before the intervention was given to the intervention group, 22 people (73.3%) and 17 people (56.7%) in the control group had poor sleep quality; At the same time, after the intervention was given to the intervention group, those classified as having poor sleep quality decreased to 3 people (10%), and in the control group 7 people (23.3%). The comparison of sleep quality between before and after the intervention was statistically analyzed using the Chi-square test in both research groups, showing a significant difference (p <0.05).

**Table 5 Comparison of Sleep Disturbance Scores in the Two Research Groups**

| Sleep Disorders (Score data) | Group | | p*value) |
| --- | --- | --- | --- |
| | Intervention (n=30) | Control (n=30) | |
| Before intervention: | | | 0.221 |
| Median | 12 | 12 | |
| Range | 5 – 19 | 5 – 20 | |
| After intervention: | | | <0.001 |
| Median | 8 | 12 | |
| Range | 0 – 13 | 0 – 19 | |
| Sleep Quality Score Increase: | | | 0.019 |
| Median | 4 | 0 | |
| Range | -5 – 13 | 0 – 9 | |

**Information :***) based on Mann-Whitney test; **) Wilcoxon test.

Table 5 presents the comparison of sleep disturbance scores before and after the intervention. Prior to the intervention, both the treatment and control groups had the same median score of 12, indicating no significant difference (p > 0.05). Following the intervention, the median score in the treatment group decreased to 8, while the control group remained at 12. This difference was statistically significant (p < 0.05). The improvement in sleep quality scores was four points in the treatment group and zero in the control group, with the between-group difference confirmed as statistically significant.

Sleep disturbance scores were categorized as follows: mild (1–9), moderate (10–18), and severe (19–27), as shown in Table 6. In the treatment group, two participants previously classified in the severe category shifted to the moderate category after the intervention. In contrast, in the control group, seven participants were initially categorized as having severe sleep disturbances; after the intervention, two remained in the severe category, while five shifted to the mild category.

**Table 6. Comparison of Sleep Disturbances Before and After Intervention Given to Both Research Groups**

| Sleep Disorders | Group | | p-value |
|---|---|---|---|
| | Intervention (n=30) | Control (n=30) | |
| **Before intervention:** | | | 0.195 |
| Light (score 1-9) | 11 (36.7%) | 9 (30.0%) | |
| Moderate (score 10-18) | 17 (56.7%) | 14 (46.7%) | |
| Heavy (score 19-27) | 2 (6.7%) | 7 (23.3%) | |
| **After intervention:** | | | **<0.001** |
| Normal (score 0) | 5 (16.7%) | 3 (10.0%) | |
| Light (score 1-9) | 21 (70.0%) | 6 (20.0%) | |
| Moderate (score 10-18) | 4 (13.3%) | 19 (63.3%) | |
| Heavy (score 19-27) | 0 | 2 (6.7%) | |
| **Comparison before vs after intervention** | **p<0.001**\*\*) | **P=0.005**\*\*) | |

**Information :**\*) Chi-square test; \*\*) Marginal Homogeneity Test.

The table above shows that in the examination of the Comparison of Sleep Disorder Scores before the intervention in both research groups, there was a change in status in the treatment group, which was initially in the severe category of 2 people (6.7%) to the moderate category of 21 people (70.0%) after the intervention was given;. In contrast, in the control group before the intervention was given, those in the severe sleep disorder category were seven people (23.3%), two people (6.7%) in the severe category and six people (20.0%) in the mild category. The comparison of sleep disorders before and after the intervention was statistically analyzed using the Chi-square test in both research groups, showing a significant difference (p <0.05).

## DISCUSSION

### Characteristics of Subjects in Both Research Groups

Among the pregnant women participating in this study, the majority in both the intervention and control groups were aged 20–30 years, totaling 18 individuals (5.4%). This indicates that most respondents were within the safe age range for pregnancy. According to Fransiska et al. (2024), the age range of 20–35 years represents a healthy and robust reproductive period, during which women are more capable of participating in pregnancy-related activities compared to those over 35, who are considered at higher risk and may lack the physical resilience required during pregnancy (Fransiska Amelya & Herlinda, 2024). Bakri et al (2019) further emphasize that women under 20 years of age may not have fully developed reproductive systems, rendering them physiologically unprepared for pregnancy and childbirth. Conversely, women over 35 tend to experience a gradual decline in endometrial function,

which can negatively impact uterine contractions during labour and the postpartum period(Bakri et al., 2019).

Ju et al. (2024) support the notion that the 20–35 age range is optimal for pregnancy, as it aligns with both reproductive maturity and psychological readiness. At this stage, women are more likely to make informed decisions based on personal experiences, particularly those related to pregnancy, childbirth, and postpartum care. Health education programs delivered during this period—when individuals are entering marriage and preparing for pregnancy—can significantly enhance their ability to navigate the physical and emotional changes of pregnancy. In contrast, younger and older women may face greater challenges in adapting to these changes, which are closely linked to the maturity and readiness of their reproductive systems (Ju et al., 2024).

The study revealed that the majority of participants had attained a high school level of education. According to Muyunda et al , (2016) educational attainment significantly enhances an individual's ability to comprehend information and follow guidance provided by researchers, particularly regarding the importance of maternal health during pregnancy. Individuals with higher levels of education are more likely to respond rationally to challenges and absorb information effectively, thereby acquiring greater knowledge and making informed decisions (Muyunda et al., 2016).

The study found that the majority of respondents were either unemployed or homemakers (IRT). This aligns with previous research on the benefits of Prenatal Yoga in improving sleep quality among pregnant women among third-trimester pregnant women. Rahayu and Astuti (2019) reported that more than half of pregnant women who had the leisure time to participate in Prenatal Yoga were not employed. Pregnant women who are not engaged in formal employment tend to have limited interaction with broader community and organizational activities. It is often assumed that employed pregnant women possess greater access to information and higher levels of knowledge due to their exposure to diverse environments.

However, homemakers or unemployed pregnant women may benefit from having more free time, allowing them to engage in activities more comfortably (Rahayu & Hastuti, 2018). Wulandari (2019) noted that occupational stress and workplace pressures can negatively impact sleep quality during pregnancy. Excessive workloads or limited physical capacity may lead to health complications, including those influenced by environmental conditions (P. Wulandari et al., 2018). Furthermore, mothers who are not working have more time and opportunity to prepare for childbirth and motherhood. They are better positioned to attend prenatal classes,

seek out information, and engage in self-directed learning compared to mothers who remain actively employed during pregnancy (Corrigan et al., 2020).

**Sleep Quality in Pregnant Women in the Third Trimester**

Pregnant women reported improved sleep quality following participation in prenatal yoga, as evidenced by significant changes between pretest and post-test data. There was an increase in the proportion of respondents who perceived their sleep quality as satisfactory, alongside a decrease in reports of poor sleep quality. These findings suggest that subjective sleep quality serves as a key indicator of overall sleep health. According to Azward H (2021), prenatal yoga during pregnancy prioritizes comfort and safety, offering multiple benefits. These include improved sleep quality, reduced muscular tension, and relief from common physical discomforts such as back and lower back pain (Azward et al., 2021).

Research findings, including those by Meilinda & Alita Ayani (2020), demonstrate a significant improvement in the average sleep quality of third-trimester pregnant women following yoga intervention. Their study found that participants who engaged in prenatal yoga experienced enhanced sleep quality, attributed to yoga's role in alleviating physical discomfort during pregnancy and preparing the body for childbirth (Meilinda & Ayani, 2020). Similarly, Putri and Nur (2021) reported that sleep quality improved after four yoga sessions conducted over a 14-day period. This enhancement was linked to increased comfort, tranquillity, and emotional serenity. The guided movements and meditation involved in yoga promote more efficient oxygen flow to the brain, fostering a sense of freshness, calmness, improved concentration, and restful sleep (Putri & Nur, 2021). Further evidence from Sari and Kumorojati (2019) supports these findings. In their study involving 34 third-trimester pregnant women, 59.5% of participants initially reported poor sleep quality. After participating in prenatal yoga, the proportion of respondents reporting good sleep quality rose to 73% (Sari & Kumorojati, 2020).

Physiological changes during pregnancy can significantly affect expectant mothers, beginning with nidation, where the body responds to the presence of foreign entities. In the third trimester, women commonly experience discomfort due to abdominal expansion, structural adjustments, and hormonal fluctuations (Zachariah et al., 2019). These changes often lead to symptoms such as back pain, leg cramps, abdominal discomfort, frequent urination, respiratory issues, and sleep disturbances.

Sleep disturbances in pregnancy are frequently associated with depression and exacerbated by hormonal shifts, particularly fluctuations in serotonin levels, which can contribute to stress and insomnia (Elviyanti et al., 2024).During the third trimester, sleep

architecture is altered—slow-wave and REM sleep decrease, while stage one sleep increases. Contributing factors include physical discomforts such as back pain, frequent urination, fetal movement, leg cramps, and fatigue.

Prenatal yoga emphasizes comfort, stretching, and relaxation, offering a range of benefits including increased energy, reduced stress and anxiety, improved sleep quality, relief from muscle tension, and alleviation of common physical discomforts such as back and pelvic pain. It also supports postnatal recovery, emotional regulation, enhanced self-confidence, and mental tranquillity through breathing exercises and meditation (Ismiyati & Faruq, 2020;Pratama & Damayanti, 2022). This study suggests that prenatal yoga, with its focus on breath control and mental focus, serves as an effective physical and emotional intervention that helps pregnant women manage discomfort and improve sleep quality during the third trimester.

**Sleep Disorders in Pregnant Women in The Third Trimester**

Pregnant women commonly experience a range of symptoms during the second and third trimesters of gestation. Many report frequent nighttime awakenings, sleep disturbances or insomnia, difficulty maintaining sleep, and general restlessness, particularly in the later stages of pregnancy. Typical third-trimester symptoms include back pain, leg pain, and frequent urination (Sheriff Hassan Abd Allatif et al., 2024)(Anwar et al., 2022).

These issues are often influenced by fetal growth, which can affect both the duration and quality of rest. As the fetus enlarges, it may exert pressure on the bladder, reducing its capacity and prompting more frequent urination. Physiologically, sleep disturbances may also result from fetal movement, weight gain, and changes in spinal anatomy, all of which contribute to lower back discomfort. This pain often extends to the extremities and is accompanied by muscle cramps. Such physical discomforts can lead to psychological changes, as the physical demands of pregnancy and the anticipation of labor begin to affect emotional well-being. Anxiety, in particular, is a known risk factor that can further diminish sleep quality during the third trimester (S. Wulandari & Wantini, 2021).

Indrianingrum (2020) found that physical discomfort during pregnancy is closely correlated with sleep quality in third-trimester pregnant women. Environmental factors such as ambient temperature and inadequate ventilation were also reported to negatively impact sleep. Several respondents noted that noise—particularly from a snoring spouse—and elevated room temperatures contributed to sleep disturbances, especially among those experiencing overheating during pregnancy (Indrianingrum, 2020).

These findings are supported by Nadholta et al, (2023) who conducted a randomized controlled trial involving 100 pregnant women in India. Participants in a 16-week prenatal yoga

program showed significant reductions in stress, anxiety, and depression, along with improvements in overall quality of life compared to the control group. While the primary focus was on psychological well-being, enhanced sleep quality emerged as a notable secondary benefit of the intervention (Nadholta et al., 2023). Further evidence comes from Wulan (2023) whose study employed a pretest-posttest design with two groups to evaluate the effects of prenatal yoga on sleep quality and anxiety levels in third-trimester pregnant women. The results indicated that prenatal yoga significantly improved sleep quality and reduced anxiety (Wulan, 2023). Similarly, Nurlelawati et al. (2023) conducted a pre-experimental study using a single-group pretest-posttest design to assess the impact of prenatal yoga on sleep quality. Their findings revealed a significant improvement in sleep quality following the intervention (Nurlelawati et al., 2023).

Kurdartu et al. (2020) demonstrated that pregnant women who participated in prenatal yoga experienced significant improvements in psychological and physiological well-being compared to the control group. Specifically, the yoga group showed a marked reduction in anxiety levels ($p < 0.001$), a significant decrease in plasma cortisol levels ($p < 0.001$), and notable improvements in sleep quality ($p < 0.001$). These findings suggest that prenatal yoga is an effective non-pharmacological intervention for alleviating anxiety, reducing stress, and enhancing sleep quality in pregnant women, thereby supporting its integration into antenatal care programs (Kundarti et al., 2020).

**CONCLUSIONS**

This study demonstrated that prenatal yoga effectively improves sleep quality and reduces sleep disturbances among third-trimester pregnant women, without causing adverse effects on blood pressure or respiration. As such, prenatal yoga is recommended as a safe, non-pharmacological intervention to support maternal sleep health within primary healthcare settings. However, the study was conducted in only two community health centers located in a single city (Pematangsiantar), which may limit the generalizability of the findings to pregnant women in other regions or those with different socio-economic backgrounds.

Prenatal yoga should be integrated into routine antenatal care at the primary healthcare level, given its demonstrated effectiveness in enhancing sleep quality during the third trimester. Healthcare providers should receive training to facilitate safe and accessible yoga practices, and educational efforts on sleep health during pregnancy should be strengthened. Further research involving larger sample sizes and randomized controlled designs is recommended to validate these findings and investigate their long-term impact.

## REFERENCES

Anwar, D. K., Moneim, E. F. A., Mohamady, S. H., & Saied, D. S. (2022). *Study of traditional methods utilized to relieve minor discomfort during the third trimester of pregnancy*. https://doi.org/10.52589/ajhnmvxjsjxph.

Azward, H., Ramadhany, S., Pelupessy, N., Usman, A. N., & Bara, F. T. (2021). Prenatal yoga exercise improves sleep quality in the third trimester of pregnant women. *Gaceta Sanitaria*, *35*, S258–S262. https://doi.org/10.1016/j.gaceta.2021.10.030

Bakri, D. U., Adenin, S. S., & Wahid, I. (2019). Faktor-Faktor Yang Berhubungan Dengan Kejadian Perdarahan Postpartum Pada Ibu Bersalin di Wilayah Kerja Dinas Kesehatan Kabupaten Merangin. *Dinamika Kesehatan: Jurnal Kebidanan Dan Keperawatan*, *10*(2), 546–560. https://doi.org/10.33859/dksm.v10i2.512

Buysse, D. J., Reynolds III, C. F., Monk, T. H., Berman, S. R., & Kupfer, D. J. (1989). The Pittsburgh Sleep Quality Index: a new instrument for psychiatric practice and research. *Psychiatry Research*, *28*(2), 193–213.

Corrigan, L., Eustace-Cook, J., Moran, P., & Daly, D. (2020). The effectiveness and characteristics of pregnancy yoga interventions: a systematic review protocol. *HRB Open Research*, *2*, 33. https://doi.org/10.12688/hrbopenres.12967.2

Elviyanti, D., Sulastri, M., & Saputri, M. T. (2024). Hubungan Kecemasan Dan Aktivitas Fisik Dengan Gangguan Tidur Ibu Hamil TM III Di Rs. Ummi Bengkulu Tahun 2024. *Jurnal Kesehatan Mitra Sekawan*, *1*(1), 7–14. https://doi.org/10.70963/jkmp.v1i1.30

Fransiska Amelya, A., & Herlinda, H. (2024). *Asuhan Kebidanan Komprehensif Pada Ibu Hamil G4P3A0 Trimester III Dengan Resiko Tinggi Usia> 35 Tahun Di PMB "E" Betungan Kota Bengkulu Tahun 2024*. Sekolah Tinggi Ilmu Kesehatan Sapta Bakti.

Gustina, G., & Nurbaiti, N. (2020). Pengaruh Prenatal Care Yoga terhadap Pengurangan Keluhan Ketidaknyamanan Ibu Hamil Trimester III di Puskesmas Putri AyuKota Jambi. *Jurnal Akademika Baiturrahim Jambi*, *9*(2), 240–245. https://doi.org/10.36565/jab.v9i2.229

Hanafie Das, S. W., Halik, A., Ahdar, & Iman, B. (2022). Prenatal education process based on local wisdom in Indonesia. *Education Research International*, *2022*(1), 6500362. https://doi.org/10.1155/2022/6500362

Holden, S. C., Manor, B., Zhou, J., Zera, C., Davis, R. B., & Yeh, G. Y. (2019). Prenatal yoga for back pain, balance, and maternal wellness: a randomized, controlled pilot study. *Global Advances in Health and Medicine*, *8*, 2164956119870984. https://doi.org/10.1177/2164956119870984

Ibrahim, S. W. A., & Zulhijjah, S. (2025). Prenatal Gentle Yoga On The Anxiety Level Of Pregnant Women In The Third Trimester. *JKM (Jurnal Kebidanan Malahayati)*, *11*(2), 158–163.

Indrianingrum, I. (2020). Ketidaknyamanan Keluhan Pusing Pada Ibu Hamil Di Wilayah Kerja Puskesmas Gribig Kabupaten Kudus. *Jurnal Ilmu Keperawatan Dan Kebidanan*, *11*(2), 265–271. https://doi.org/10.26751/jikk.v11i2.844

Ismiyati, A., & Faruq, Z. H. (2020). Pengaruh prenatal yoga terhadap kualitas tidur pada ibu hamil trimester III. *Puinovakesmas*, *1*(2), 70–77. https://doi.org/10.29238/puinova.v1i2.890

Ju, D., Zhang, K., Yuan, M., Li, B., & Zeng, T. (2024). Mediating role of childbirth readiness in the relationship between social support and psychological birth trauma in primiparous women: a nationwide cross-sectional study in China. *BMJ Open*, *14*(9), e080481. https://doi.org/10.1136/bmjopen-2023-080481

Kluny, R., & Dillard, D. M. (2022). Prenatal bonding: the importance of connecting with body and baby. In *Fertility, Pregnancy, and Wellness* (pp. 439–448). Elsevier. https://doi.org/10.1016/B978-0-12-818309-0.00008-3

Knutson, K. L., Phelan, J., Paskow, M. J., Roach, A., Whiton, K., Langer, G., Hillygus, D. S., Mokrzycki, M., Broughton, W. A., & Chokroverty, S. (2017). The National Sleep Foundation's sleep health index. *Sleep Health*, *3*(4), 234–240. https://doi.org/10.1016/j.sleh.2017.05.011

Kundarti, F. I., Titisari, I., Sepdianto, T. R. I. C., Karnasih, I., & Sugijati, S. (2020). The Effect of prenatal yoga on anxiety, cortisol and sleep quality. *International Journal of Pharmaceutical Research (09752366)*, *12*(3).

Makhija, A., Khatik, N., & Raghunandan, C. (2021). A randomized control trial to study the effect of integrated yoga on pregnancy outcome in hypertensive disorder of pregnancy. *Complementary Therapies in Clinical Practice*, *43*, 101366.

Mayoh, J. (2019). Perfect pregnancy? Pregnant bodies, digital leisure and the presentation of self. *Leisure Studies*, *38*(2), 204–217.

Meilinda, V., & Ayani, L. A. (2020). Pengaruh Senam Yoga Terhadap Peningkatan Kualitas Tidur Pada Ibu Primigravida Trimester Iii. *Maternal Child Health Care*, *2*(3), 381–388.

Muyunda, B., Makasa, M., Jacobs, C., Musonda, P., & Michelo, C. (2016). Higher educational attainment associated with optimal antenatal care visits among childbearing women in Zambia. *Frontiers in Public Health*, *4*, 127. https://doi.org/10.3389/fpubh.2016.00127

Nadholta, P., Kumar, K., Saha, P. K., Suri, V., Singh, A., & Anand, A. (2023). Mind-body practice as a primer to maintain psychological health among pregnant women– YOGESTA–a randomized controlled trial. *Frontiers in Public Health*, *11*, 1201371.

Nadholta, P., Saha, P. K., & Anand, A. (2024). A framework of workplace yoga for expectant mothers: A comprehensive review of benefits, safety considerations, and future perspectives. *International Journal of Gynecology & Obstetrics*, *167*(3), 934–940. https://doi.org/10.1002/ijgo.15777

Nurhayati, F., Marlina, D., & Susanti, Y. (2024). Pengaruh Yoga Nifas Terhadap Kualitas Tidur Ibu Nifas Di Wilayah Kerja UPT Puskesmas Cibalong Garut Tahun 2024. *Pin-Litamas*, *4*(1), 229–238.

Nurlelawati, E., Prihantiningsih, A., Salanti, P., Gusti, N. W., Nisa, Z. H., & Rodiyah, D. (2023). The Effect Of Prenatal Yoga Exercises On The Sleep Quality Of Pregnant Women In The 3rd Trimester At Pmb E, Depok City November 2022–February 2023 Period. *Proceeding of International Conference on Innovations in Social Sciences Education and Engineering*, *3*, 129.

Patrick, A. (2023). Pregnancy & Childbirth. In *Women's Health in Britain and America: Texts and Contexts* (pp. 15–193). Springer.

Pratama, R. N., & Damayanti, E. (2022). Peningkatan Kualitas Tidur Ibu Hamil Trimester III Dengan Penerapan Prenatal Yoga. *Babul Ilmi Jurnal Ilmiah Multi Science Kesehatan*, *14*(2). https://doi.org/10.36729/bi.v14i2.941

Pratiwi, E. N., Astuti, H. P., & Umarianti, T. (2021). Peningkatan kesehatan ibu hamil melalu prenatal yoga dalam upaya mengurangi kecemasan dan keluhan fisik. *Jurnal Pengabdian Harapan Ibu (JPHI)*, *3*(1), 1–12. https://doi.org/10.30644/jphi.v3i1.486

Putri, M., & Nur, H. (2021). Pengaruh Prenatal Yoga Dengan Kualitas Tidur Ibu Hamil Trimester Iii Di Uptd Puskesmas Aek Loba Tahun 2021. *JIDAN: Jurnal Ilmiah Kebidanan*, *1*(2), 61–71. https://doi.org/10.51771/jdn.v1i2.66

Rahayu, D. T., & Hastuti, N. H. (2018). Pengaruh Keteraturan Senam Hamil terhadap Kualitas Tidur pada Ibu Hamil Trimester III di Desa Gedangsewupare Kediri. *Jurnal Kebidanan Midwiferia*, *4*(2), 34–45. https://doi.org/10.21070/mid.v4i2.2052

Sari, A. A., & Kumorojati, R. (2020). Pengaruh Yoga Hamil Terhadap Kualitas Tidur Pada Ibu Hamil Trimester Iii Di Klinik Pratama Asih Waluyo Jati Bantul Yogyakarta. *Jurnal Kesehatan Masyarakat Dan Lingkungan Hidup*, *5*(1), 29–33.

Shamabadi, R., Eslamzadeh, M., Eskandarnia, E., & Asgharipour, N. (2023). The Effect of

Mindfulness Interventions on the Sleep Quality of Pregnant Mothers in the Second and Third Trimesters of Pregnancy: Mindfulness and Sleep Quality in Pregnancy. *Galen Medical Journal*, *12*, e2750–e2750.

Sheriff Hassan Abd Allatif, K., Mohammed Fahmy, N., Fatthy Mohamed Ahmed, A., & Ezzat Said, N. (2024). Pregnant Women's Knowledge and Practice Regarding Minor Discomfort During Third Trimester. *Egyptian Journal of Health Care*, *15*(4), 432–449. https://doi.org/10.21608/ejhc.2024.387455

Wulan, S. (2023). The Effect Of Maternity Position On The Length Of Labor Time During The Active Phase Of Primigravida. *Jurnal Keperawatan Dan Fisioterapi (JKF)*, *5*(2), 370–374.

Wulandari, P., Retnaningsih, D., & Aliyah, E. (2018). The effect of prenatal yoga on primigravida trimester II and III in studio qita yoga district south Semarang Indonesia. *Jurnal Keperawatan*, *9*(1), 25–34. https://doi.org/10.22219/jk.v9i1.4910

Wulandari, S., & Wantini, N. A. (2021). Ketidaknyamanan Fisik Dan Psikologis Pada Ibu Hamil Trimester III Di Wilayah Puskesmas Berbah Sleman Daerah Istimewa Yogyakarta. *Jurnal Kebidanan Indonesia*, *12*(1). https://doi.org/10.36419/jki.v12i1.438

Zachariah, S. K., Fenn, M., Jacob, K., Arthungal, S. A., & Zachariah, S. A. (2019). Management of acute abdomen in pregnancy: current perspectives. *International Journal of Women's Health*, 119–134.